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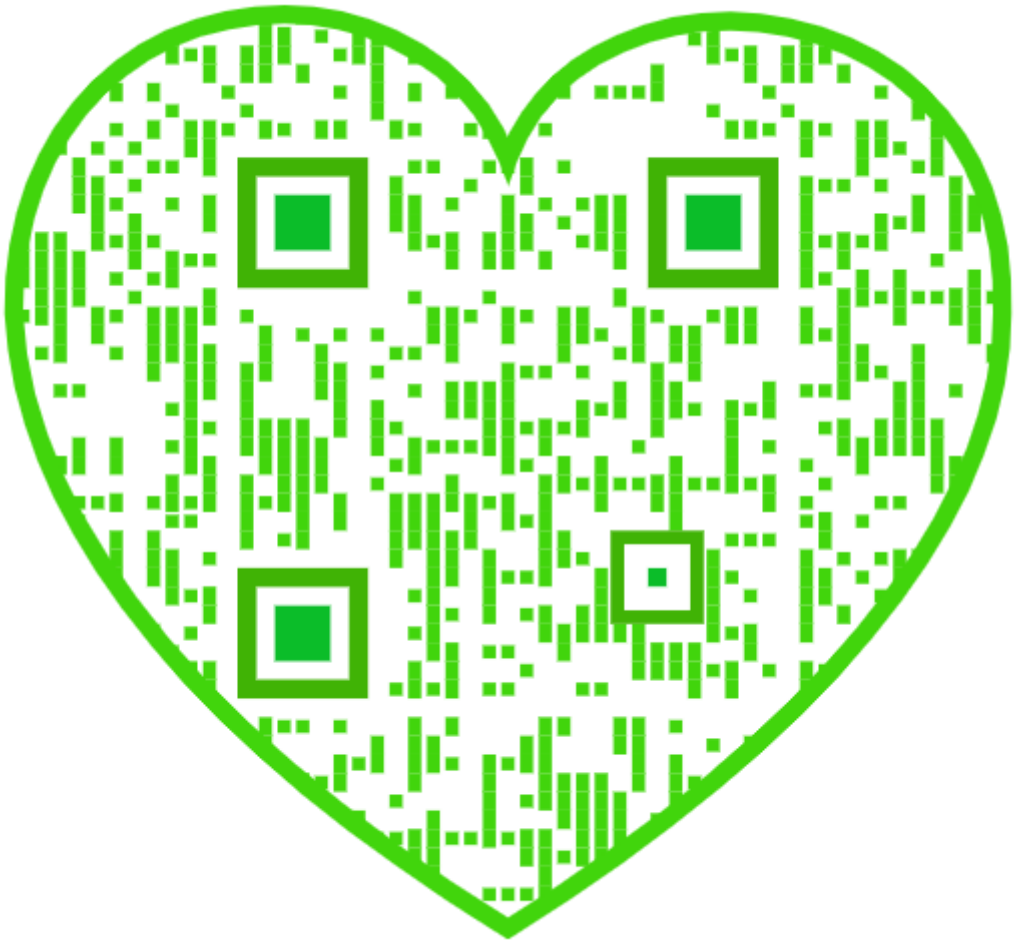


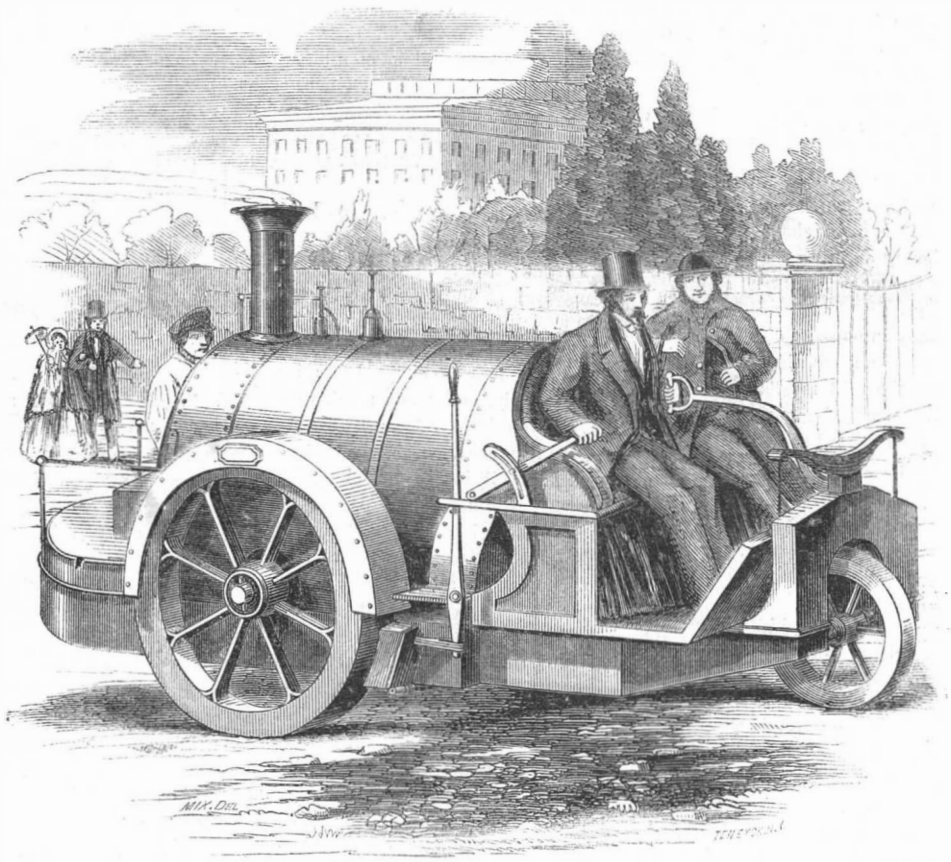
Scientific American

A JOURNAL OF PRACTICAL INFORMATION IN ART, SCIENCE, MECHANICS, AGRICULTURE, CHEMISTRY, AND MANUFACTURES.

VOL. III.—No. 1. NEW YORK, JULY 2, 1860. NEW SERIES.

STEAM CARRIAGES FOR COMMON ROADS.

This is not a new subject, but it is one which has recently assumed a most interesting aspect. Just prior to the advent of railroads, many efforts were made to supersede animal with steam-power for public travel on common roads; but the grand and overwhelming advantages of railroads led to the latter being adopted so rapidly and extensively that common roads and their agencies for conveyance were excluded from public consideration until quite recently. We have, in a former volume, noticed the success which has attended the traction engine of J. Boydell, in England; and we have also described the American self-propelling steam fire-engines. We now present an illustration of Rickett's steam carriage, which was recently submitted to Prince Albert and the Queen. This invention is designed for a new purpose, viz.: a private carriage, with room for three persons in front and a fireman behind. "It is arranged to run at an average speed of 10 miles per hour; indeed, on good roads, 16 miles per hour has been easily attained. In ascending steep hills, by moving a handle (without stopping), the power is multiplied two-and-a-half times, and the speed consequently reduced to four miles per hour on hills with inclination of 1 in 10. The carriage is mounted on three wheels, each having independent springs—one small wheel in front, which is used for steering, and two behind, one or both of which are employed in propelling; one of them being fixed on the shaft and the other engaged by a clutch, so that when disengaged the carriage may be turned round in its own length without stopping. It is easily guided, by a handle from the fork of the front wheel, which is central with the outside seat; a brake is applied to each driving wheel, worked by a lever from the seat, so that the engine is entirely under the control of the driver.



RICKETT'S STEAM CARRIAGE FOR COMMON ROADS.

The engine is built upon a tank, which forms a strong tubular framework; the boiler being placed above, and the whole of the machinery is contained in the space between the boiler and tank, entirely protected from dust and dirt, and within reach of the stoker for oiling, &c. The tank contains 90 gallons of water, sufficient for 10 miles' run. The boiler is made of steel, and constructed so that it is not injuriously affected by variations of level, as it is worked at a pressure of 150 lbs. to the square inch, and supplies steam to a pair of 3½-inch cylinder with 7-inch stroke; it evaporates about 1½ gallon of water per minute, and consumes from 8 to 10 lbs. of coal per mile. The weight of the engine and carriage is 30 cwt., and, with a full load of water, 12 cwt., coal, 3 cwt., passengers, 5 cwt., equals 2½ tuns.

Some idea may be formed of the functional resistance on common roads, when it is mentioned that as much power is required to draw 1 tun on a common road as 15 to 20 tuns on a railroad; and in this engine, to convey its full load at 15 miles per hour on a level, requires an actual development of 10-horse power, so that great power and little weight are essentials in these engines. No great difficulty has been experienced in working them—occasionally, a young horse shies, when the engine is instantly stopped, and all noise and appearance of steam suppressed till it has passed. It is stated that this engine will be shortly taken to Belgium, but others are in course of manufacture by Mr. Rickett, in his foundry, at Buckingham, England."

We do not know but that the time may yet arrive when there will be a great "Derby day" for steam horses, and when gentlemen will mount true fire-blooded animals, contending, with lungs of iron, for prizes of gold. Mr. Rickett has, at least, led the way with the foregoing engine for such enterprises. The above description, as quoted, is taken from the London *Illustrated News*. The great resistance which is given for common roads confirms our views regarding such agencies.

The London *Engineer*, in a late article on traction engines for cities, stated that this was purely a question of the relative superiority of steam-power and horse-power, and there can be no doubt of the immense superiority, in most respects, of the former. In the Woolwich dock-yard, a powerful engine has been used for drawing heavy goods for a year past, and several of the large engineering companies in England now employ them in their establishments. For drawing very heavy loads with a slow motion, no one, we believe, will question the immense superiority of a well-constructed steam carriage; but when speed is desired with great power of draught, the rail should always be employed, because it is such an economizer of power.

THE FRENCH STEAM RAMS.

Donald McKay (who is now in France), while writing to a professional friend in Boston, thus describes what he saw in the imperial arsenal at Toulon:—"The most interesting constructions are the two iron-cased frigates *La Gloire* and *L'Invincible*, of 36 guns. *La Gloire* has been already launched, and they are just about to apply the heavy iron casing. *L'Invincible* is yet on the stocks, but nearly ready for launching. I had an opportunity to visit them thoroughly inside and outside, and they are, without any question, most powerful vessels—equal in size to a 90-gun ship. The iron casing will extend all the length of the ship, and to more than six feet below the load-line. They are very sharp forward and aft, and the deck-line has a shape very much like a whaleboat. Their engines are to be of 1,000-horse power, and each ships is to be propelled by a stationary six-bladed screw. The rig will be that of a three-mast schooner. As far as I was able to ascertain, the Frenchmen are building, in their different yards, eight or nine of these frigates and two steam rams, but of less size than those in England. All the frigates, however, may serve as steam rams, as their whole construction makes them very well fit for that purpose. The frigates are pierced for 40 guns of the heaviest caliber; but, probably, they will be armed only with 34 guns in the lower battery and with two guns on the upper battery, firing straight forward from out an iron-cased forecastle. Taking in the whole, the arsenal and port of Toulon make a great impression upon the mind of the observer. At the magazine of artillery, there was heaped an immense amount of guns of the heaviest caliber; also, a lot of breech-loading guns for the iron-cased frigates, and an immense number of elongated shot and shell. All guns that I saw were rifles."

We understand that no less than 14,000 persons are now employed in this single French dock-yard, which is vastly more than the whole force in all the American yards combined.

THE TIME TO GATHER HERBS.—Everybody who has an herb bed in the garden, or who sets a value upon a good supply of dried herbs, should see to securing them this month, or, at least, the most of them. The right time to gather herbs for drying or other purposes is when they are just beginning to come into flower. They then possess their peculiar virtues in a higher degree than at any other period. When cut, do not lay them in the sun, as the excessive heat will cause them to dry rapidly; the leaves and stems become brittle, and the slightest blow will cause them to fall off and be lost. Let them be laid in the shade, and carefully protected from the rain or any dampness.—*Farmer and Gardener. Phila.*

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OUR SPECIAL CORRESPONDENCE.

The Cotton-seed Oil Manufacture—The Business Profitably Established on a very Large Scale—Description of the Establishment of the First Successful Manufacturer—Machinery and Process—Value of the Cake—Magnificent Future of the Business.

NEW ORLEANS, LA., May 30, 1860.

MESSRS. EDITORS:—Being forced to remain in New Orleans nearly the whole of a day, I thought I could find nothing of more interest in your line than a description of the great cotton-seed oil manufactory of F. M. Fisk. This business, after struggling through a feeble and ailing infancy of 30 years, has finally fallen into the hands of a man who has established it on a paying and permanent foundation, and it now has the promise of a brilliant and widely-expanding career. Mr. Fisk is the first man who has succeeded in this manufacture. I have been over his establishment. It occupies a plot of ground 150x150 feet, which is mostly covered by brick buildings three stories in hight. His machinery is driven by a 35-horse power engine, and he makes 500 gallons of oil and a little more than 5 tuns of cake per day, using from 12 to 15 tuns of seed; from which it appears that a tun of cotton seed yields about 35 to 40 gallons of oil and 700 or 800 pounds of oil cake. Mr. Fisk shipped 800 tuns of the cake to England, and visited that country himself to introduce the article among the English farmers as food for their cattle. It was upon effecting a sale for this portion of the product that the success of the business depended. The cake now sells for about $40 per tun at the manufactory. Two kinds of oil are made, the variety depending upon the clarifying process used; the white selling for 80c. per gallon and the yellow for 60c. The seeds costs $11 per tun on the levee, and about $13 at the mill.

The process of manufacture is simple and rapid. The seed is hulled, crushed, heated and pressed; the oil is then refined; the whole process occupying less than two days. The hulling mill is made of German burr-stones, these being softer than the French, and, consequently, more easily dressed. The running stone is in the shape of a very thick grindstone, the periphery forming the grinding face. The stationary stone is concave, fitting the runner, and both have their grinding surfaces grooved; the grooves running diagonally in opposite directions. This rolls off the burr, at the same time crushing the seed. As the seed leaves the mill it falls upon a sieve, which separates the hull and adhering cotton from the crushed seed. It is then passed again through a similar mill, and again sifted; after which it is run between two iron rollers, which complete the crushing process. Being thus made sufficiently fine, it is now placed in an iron tub and heated as hot as can be done without burning; it being constantly stirred by arms upon a revolving shaft during this process. When the experienced workman finds (by feeling with his hand) that the meal is properly heated, it is put into stout linen bags, which are placed between stiff boards and subjected to the action of a powerful hydraulic press. The oil runs out in a stream, and the cakes, on being removed from the press, have the bags stripped from them, and their edges smoothly trimmed with a knife. Each cake is nearly two feet long, some nine inches wide, an inch thick, and weighs about seven pounds. The oil is clarified by a secret process, and the residue from the clarifying is used for making soap. This soap looks precisely like ordinary bar soap, but Mr. Fisk says that, as there is no resin in it, it is as soft and pleasant to the hands as the best Castile. I have tried it once, and, as far as I could judge from that one trial, the statement seems to be true. Mr. Fisk and his foreman assert that the oil is quite equal to the best of sperm, for both lubricating and illuminating purposes.

This business having been proved to be profitable with seed at $11 per tun, considering that hundreds of thousands of tuns are wasted annually, it would seem that, unless the coal oil should master it, it might grow rapidly into one of our very largest manufactures. B.

THE COTTON-SEED OIL BUSINESS

As an appropriate appendix to the foregoing letter, we here publish an interesting communication just received from the secretary of an oil company recently established in Tennessee, and which is now "floating along on the high tide of successful experiment."

MESSRS. EDITORS:—On page 280 of the last volume of that very valuable paper, the SCIENTIFIC AMERICAN, we observed a notice of our enterprise; and thinking it might be desirable upon your part, and possibly useful to us, that you should be fully informed of the nature of our products and the extent of our operations, we have sent you (by the same mail which brings this letter) a copy of our charter, list of officers, bye-laws, &c., in pamphlet form, and we will now give you some further details of the business in which we are engaged.

The supply of seed for all purposes, for years to come, is inexhaustible; the only difficulty in obtaining it existing in the fact that, when the seeds are produced at remote points from the river, they do not well bear freight at the price we can afford to give for them. This difficulty, however, will, we hope, be hereafter removed, first, by improvement in the hulling machines, so as to produce those that are portable and suitable to put up upon plantations, thus reducing the freight to simply that on the clean meat or kernel of the seed; and secondly, by an improvement in the demand, and consequent improvement in the price of the products, as they become (as you suggest) utilized by the ingenuity of the thousands of ingenious minds which are scattered through the cotton (and I will add, also, the northern) States. We now have an ingenious and experienced machinist at work upon a model for a small, light and portable huller, of such simplicity as will render it available in ordinary hands upon plantations; those now in use requiring too great an amount of mechanical skill in keeping them in order. We are well convinced that the more tests that these products are subjected to, and the more they are brought before the public, the greater will be the demand for them, and, consequently, the better price will prevail. The legitimate products are the crude oil and the oil-cake. The crude oil is of a high, clear maroon color, and much freer from the albumen, gluten and other component parts of the seed than would be supposed. We have a process—the best yet known, but one which we think susceptible of improvement by scientific men—of producing a clarified or refined oil, of about the consistency and appearance of the best lard oil, and which can be applied to all the uses that the lard oil may be. Partial and very imperfect experiments have been made by ourselves, and by other persons under our instructions, in applying it to purposes of mixing and grinding paints, and also for tanning and currying purposes, which latter it seems well adapted for; it penetrates the letter thoroughly, and tends much to soften the fiber of it. We have sold over 1,500 barrels for this purpose, and in every instance it has given entire satisfaction. As a machine oil, in its refined state, it is about equal to the best lard oil. We have also a process of preparing from it what we have named the "railroad lubricator," which we hope to so far perfect as to make it an article that will supersede all others for machinery of a heavy kind or which runs at great speed. The object we have endeavored to obtain is to remove from the oil all glutinous matter of the seed, and yet to give it a consistency that will retain it long upon the journals while all its liquid and lubricating qualities are retained; this we have arrived at to a great extent, but we are aware that the process may be very much improved.

As an oil for soap of every quality—from the lowest to the highest grades of fancy toilet soap—it has no superior; the refuse of the refining process making the best class of the common washing soap, and the refined oil being capable of converting into the finest qualities of delicate shaving and toilet soap.

The oil-cake is a clean and portable article of food for "stock," such as beef cattle, hogs, sheep, poultry, and especially milch cowes, and of greater richness than any other food known; combing, as it does, all the qualities of the best food used. We are confident, too, that when this cotton seed oil-cake and meal shall have been properly tested, it will prove a far more available, cheaper, cleaner, and more pleasant article as a fertilizer of the soil, or as a dressing for vegetation, than any other. We have made some experiments in this way, but desire others having better opportunities to test the subject fully.

It remains but to give you a synopsis of capacity, &c. We are now manufacturing daily 500 gallons of oil and 7½ tuns of oil-cake and meal. In 60 days we calculate to have six presses running, when our daily products will be 1,500 gallons of oil and 24 tuns of oil-cake and meal. We refer all who may wish to purchase any of our products to Messrs. McBride & Brothers, No. 176 Washington-street, New York City. They are our agents for sales and keep samples.

JAMES A. GRANT, Secretary.

Grant White-lead and Cotton-seed Oil-works (Navy Yard), Memphis, Tenn., June 23, 1860.

RATS AND LEAD PIPES.

MESSRS. EDITORS:—In the SCIENTIFIC AMERICAN of June 2d, I noticed, under the head of "Notes and Queries," a reply to W. G., of Md., in which you say:—"Common sheet iron will soon rust out," &c., &c., and "there are some instances on record in which leaden water pipes have been cut through by rats." Let me give you an incident in my experience. In 1854, a gentleman in this neighborhood employed me as a carpenter to re-model his dwelling-house; and, among other things, he had a bathing-room made in the second story, with the usual water-closet arrangements, &c. A "soil pipe" extended into the cellar; thence some 20 or 30 feet horizontally (a little declining) to the outside of the house, where it emptied into a brick sewer, which extended some 50 or 60 feet into a barn cellar. Before I had completed the job, having occasion to do something in the cellar near this soil pipe (which, by-the-way, is some 4 or 5 inches in diameter, made of thick lead), I discovered a hole in the upper part of the pipe, a little on one side, some 2 inches (more or less) in diameter, irregular in shape, and very rough about the edges. On examination, it was perfectly clear that a rat had entered the sewer from the barn cellar and found his way along into the pipe some 15 or 20 feet and cut into the house cellar. To prevent any further intrusion of this kind, the proprietor placed a wire netting over the mouth of the sewer in the barn cellar. You have this fact from me, that rats will cut lead with little or no difficulty. O. T.

Newton, Mass., June 22, 1860.

[We have known of instances where rats had cut through lead pipes from the outside; but this is the first case brought to our attention of one eating his way out from the inside. It would be a hard matter to keep an old rat, that has acquired the art of chewing poisonous lead pipe and spitting out the crumbs, out of any pantry.—EDS.

MILK AND ITS PRESERVATION.

The general use of milk, as well for the nursery as in various culinary preparations, justifies a frequent recurrence to the subject, calling attention to the character of the article. Milk, like blood, is a living fluid, and it will begin to die after removal from the seat of vitality, as soon as "a fish out of water." It is so delicate a fluid that nature has provided that all young animals, as well as the infant child, shall receive it in such a way as *to prevent any contact with the air*. It was this idea that first turned Gail Borden's attention to adopt a plan to prevent incipient decomposition, by condensing milk in vacuum, evaporating its watery elements as soon as it could be drawn and brought from the cow. Milk had previously been concentrated by various methods, several of which had been patented, but previous to Mr. Borden's patented improvement, condensed milk had been used to a limited extent, principally by voyagers. Practically, it had not been produced at a sufficiently low cost to enter into competition with the sale of common milk. This has now been done. Mr. Borden claims that, by his process, milk can be condensed so rapidly and cheaply that the extra cost is more than balanced by what is saved in the reduced expenses of transporting it to market, and therefore it is now sold by the New York Condensed Milk Company at a less price than the best fluid milk. He claims that the milk is better, because it has not been exposed (as common milk must necessarily be) in its fluid state, from the time of milking to that of using it in the city.

By the process of Mr. Borden the milk is first heated by steam to a temperature of from 190° to 200°; then strained into a receiver connected with the vacuum pan, into which the milk flows in quantity indicated by the progress of evaporation. When reduced to the richness desired, which usually requires over 4 quarts of ordinary milk to make one of condensed milk, the latter is drawn from the pan and subjected to a second heating in the steam bath, to a degree indicated by the consistency; it is then again introduced into the vacuum pan

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where the ebullition goes on until the temperature of the milk is reduced by means of the vacuum and the use of cold water passing through the steam chambers. The milk is lastly put into 40-quart cans and immediately cooled down to a low temperature, when it is ready for the market.

Sometime ago, we noticed the above invention of Mr. Borden, and we are happy to be able to state that it has now become a very large business in this city.

TEA, COFFEE, AND COCOA FOR THE SICK.

BY FLORENCE NIGHTINGALE.

Too much is said against tea by wise people, and too much of tea is given to the sick by foolish people. When you see the natural and almost universal craving in English sick for their "tea," you cannot but feel that nature knows what she is about. But a little tea or coffee restores them quite as much as a great deal; and a great deal of tea, and especially of coffee, impairs the little power of digestion they have. Yet the nurse, because she sees how one or two cups of tea or coffee restores her patient, thinks that three or four will do twice as much. This is not the case at all; it is, however, certain that their is nothing yet discovered which is a substitute to the English patient for his cup of tea; he can take it when he can take nothing else, and he often cannot take anything else if he has it not. I should be very glad if any of the abusers of tea would point out what to give to an English patient after a sleepless night instead of tea. If you give it at five or six o'clock in the morning, he may even sometimes fall asleep after it, and get, perhaps, his only two or three hours' sleep during the twenty-four. At the same time you never should give tea or coffee to the sick, as a rule after five o'clock in the afternoon. Sleeplessness in the early part of the night is from excitement, generally, and is increased by tea or coffee; sleeplessness which continues to the early morning is from exhaustion often, and is relieved by tea. The only English patients I have ever known refuse tea, have been typhus cases; and the first sign of their getting better was their craving again for tea. In general the dry and dirty tongue always prefers tea to coffee, and will quite decline milk unless with tea. Coffee is a better restorative than tea, but a greater impairer of the digestion. Let the patient's taste decide. You will say that in cases of great thirst, the patient's craving decides that it will drink a great deal of tea, and that you cannot help it. But in these cases be sure that the patient requires diluents for quite other purposes than quenching the thirst; he wants a great deal of some drink, not only of tea, and the doctor will order that he is to have barley-water, or lemonade, or soda-water and milk, as the case may be. Lehmann, quoted by Dr. Christison, says, that among the well and active "the infusion of an ounce of roasted coffee daily will diminish the waste going on in the body by one-fourth;" and Dr. Christison adds that tea has the same property. Now, this is actual experiment. Lehmann weighs the man and finds the fact from his weight. It is not deducted from any "analysis" of food. All experience among the sick shows the same thing. Cocoa is often recommended to the sick in lieu of tea or coffee. But independently of the fact that English sick very generally dislike cocoa, it has quite a different effect from tea or coffee. It is an oily, starchy nut, having no restorative power at all, but simply increasing fat. It is pure mockery of the sick, therefore, to call it a substitute for tea. For any renovating stimulus it has, you might just as well offer them chestnuts instead of tea. An almost universal error among nurses is the bulk of food, and especially the drinks they offer to their patients. Suppose a patient ordered four ounces of brandy during the day, how is he to take this if you make it into four pints with diluting it? The same with tea and beaf-tea, with arrowroot, milk, &c. You have not increased the nourishment, you have not increased the renovating power of these articles, by increasing their bulk; you have very likely diminished both by giving the patient's digestion more to do; and most likely of all, the patient will leave half of what he has been ordered to take, because he could not swallow the bulk with which you have been pleased to invest it. It requires very nice observation and care (and meets with hardly any) to determine what will not be too thick or too strong for the patient to take, while giving him no more than the bulk which he is is able to swallow.

[Professor Christison, the greatest living authority on poisons and poisoning, holds beaf-tea to be the best known combination of food and drink for most cases of sickness. He has lately written about its use in the most flattering manner.—EDS.

ADVANTAGE OF A TASTE FOR SCIENCE.

A mind which has a taste for scientific inquiry, and has learned the habit of applying its principles readily to the cases which occur, has within itself an inexhaustable source of pure and exciting contemplations. One would think that Shakespeare had such a mind in view when he describes a contemplative man as finding—

"Tongues in trees, books in running brooks,
Sermons in stones, and good in everything."

Accustomed to trace the operations of general causes and the exemplification of general laws, in circumstances where the uninformed and uninquiring eye, perceives neither novelty nor beauty, he walks in the midst of wonders; every object which falls in his way elucidates some principle, affords some instruction and impresses him with a sense of harmony and order. Nor is it a mere passive pleasure which is thus communicated. A thousand questions are continually arising in his mind, a thousand objects of inquiry presenting themselves, which keep his faculties in constant exercise and his thoughts perpetually on the wing, so that lassitude is excluded from his life, and that craving after artificial excitement and dissipation of the mind which leads so many into frivolous, unworthy and destructive pursuits, is altogether eradicated from his bosom.—*Sir John Herschell.*

AMERICAN PATRONAGE OF INVENTIONS FOR SHIPS.

An English ship of 998 tuns, bound from London to Calcutta, was once compelled to anchor in the Downs to procure two more hands, although she had then a compliment of 45 all told on board, whereas an American ship of nearly the same size, bound on the same voyage, proceeded with only 21 men. The crews of both ships, excepting the captain of the American, were British seamen. Mr. Duncan Dunbar, an English shipowner, recently made this statement before a committee of the British Parliament, and stated the cause of the difference. The English ship was rigged in the old fashioned style, somewhat like a ship-of-war, and therefore required a large number of men to work her; while the American ship had almost all the modern improvements—such as patent trusses to her lower yards, iron barrels to her topsail and topgallant yards, the best of blocks and cordage, and Cunningham's patent rig, whereby her topsails could be reefed from the deck, (an English invention) and Emerson's patent windless. These enabled her to be sailed with less than half the number of men required to navigate the British ship.

COLORING OF ADULTERATED WINES.

Although many experiments have been instituted by chemists for the detection of the coloring matters employed in adulterated wines, so as to be able to distinguish the true from the false, no very positive results have yet been arrived at, because the color of genuine wine itself changes with age, and because the same colors can be imitated by various substances, all of which possess nearly the same elements when analyzed.

It is believed that some of the cheap claret wines contain alum and sulphuric acid, and the chemist Lassaigne has lately called attention to the addition of about 0.33 per cent of sulphuric acid which he had detected (but with some difficulty) in French clarets. An easy method of detecting alum, acids, logwood, cider, tannin and other mixtures used in the adulteration of wines is a great desideratum; chemists have not yet made the discovery.

AERIAL NAVIGATION BY SUN HEAT.—One of our correspondents proposes a novel method of aerial navigation, by propelling balloons through the agency of a caloric engine revolving a screw propeller, without employing fire or fuel. He designs to concentrate the rays of the sun with a large burning lens, and thus make the solar heat rarify the air to operate the engine. The proposal is a grand and novel one. No fuel fire or water being required to enable us to career in mid-heavens. We wish our correspondent success.

AMERICAN JEWELRY.

Prior to the panic in 1857, the jewelry business in the United States was in a very flourishing condition; but since that period it has been very dull, and during the past year few factories have been in operation more than four months out of the twelve. There are large jewelry manufactories in Providence, R. I., Boston and Attleboro', Mass., Waterbury, Conn., Philadelphia, Pa., New York City, and Newark, N. J. The latter place is, perhaps, the most distingushed for the extent of its establishments and the quality of its articles. These consist of gold and silverware, watch-cases, bracelets, rings, chains, seals, brooches, and all kinds of personal ornaments of this character. The stones or brilliants for American jewelry are mostly imported, but the articles themselves are supplied by our home mauufacturers, and they rival those of any other country in beauty of design and skill in fabrication.

There are various classes of jewelry. "Solid" is that which it composed of gold entirely—18 carats fine, at least; "massive jewelry" is mounted with *solid* gold, but its groundwork is of inferior metal; "filled-in work" is composed of thin-rolled gold, filled-in with common solder; "plated jewelry" is composed of an inferior metal, with a thin face of gold. Cheap trinkets are made with rolled metal, "struck-up" with dies. The ingots of which they are made contain about 1-60th of gold on the surface. Many articles are composed of brass, slightly gilt by the galvanizing process.

At the present moment, several of the jewelry manufactories in Newark, in which there were formerly employed from 200 to 400 workmen, do not contain over a dozen. It has been said by some that articles of jewelry, being luxuries, are generally first affected by "hard times," and the last to recover from their influence; and this is given as a reason for the long depression of American jewelry manufactures.

INDUSTRIAL FAIRS.

THE eighteenth annual exhibition of the Ohio Mechanics' Insttiute will be opened at Cincinnati on the evening of Sept. 24th, next, and will continue to the evening of Oct. 20th. The committee of managers intend to make it superior to any of the previous exhibitions.

MECHANICS, manufacturers, artists and inventors are referred to the advertisement of the Massachusetts Charitable Mechanic Association, in another column of this week's paper, of their ninth exhibition of American manufactures and the mechanic arts, to be held in the city of Boston, in September next. It is supposed that this will be the largest and most complete exhibition ever held by the association.

THE American Institute, at New York, will not hold their usual mechanical exhibition this Fall, owing to the difficulty of procuring a suitable building. They hope next year to have a permanent building of their own. A horticultural show will, however, take place, under the auspices of the Institute, probably in September.

PLATINUM.—This metal has a greyish-white color. In the state of fine powder it is grey, and without metallic luster; but the luster can be produced by friction. Platinum is the heaviest of all metals. (Specific gravity 21·5.) It is harder than copper but not so malleable as gold and silver. It can be drawn into exceedingly fine wire. It cannot be melted by the heat of a furnace; but it can be fused by means of a blowpipe, supplied with oxygen gas, and directed upon the flame of a spirit lamp. It can be welded at a white heat. It does not oxydize when heated in the air. Platinum dissolves in hot aqua-regia, but not in any simple acid. The solution contains chloride of platinum. When pure alkalies or nitrate of potash is ignited with platinum, the metal is corroded. When brought, in the state of a fine, porous, spongy mass, into a mixture of oxygen and hydrogen gas, it becomes red-hot and inflames the gas.

THE GREAT TORNADO IN THE WEST.—We have received an extremely graphic and interesting description of the wholesale devastation occasioned by the tremendous tornado which swept over the West on June 3d, but it is unavoidably "crowded out" of the present number.

THE CITY OF THE DEAD.—There have been interred at Greenwood Cemetery since Sept. 5, 1840 (when the first body was placed in the ground at that place), up to Saturday, June 9, 1860, 76,797 persons!

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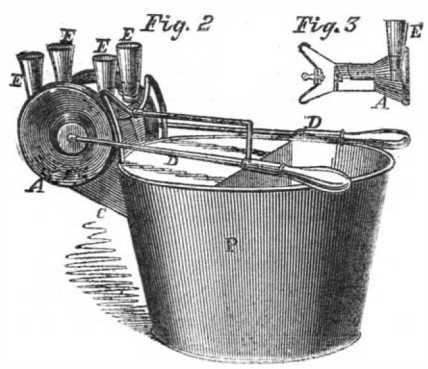
IMPROVED COW-MILKER.

A natural, quick and easy method of milking cows by mechanism deserves general attention. Various contrivances have been devised for such purposes, but the inventor of the milker here illustrated believes that it imitates the natural action of the calf in a very perfect manner, and that it is free from objections that have been urged against other devices. The accompanying description of the engravings will convey clear ideas of the improvement.

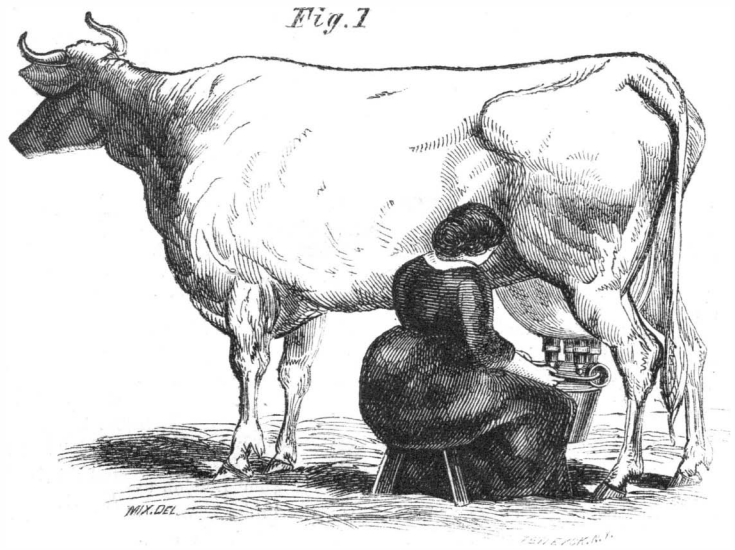
The invention consists of two distinct single-acting disk pumps, A—one at each side—connected together by a semi-cylindrical support, and the whole is secured to the socket, C, of the milk-pail, P, Fig. 2. Each pump has a head of vulcanized india-rubber, which is moved back and forth like a bellows by the handles, D D. The pressure upon one pump is counterbalanced by that upon the other, so that the pail remains undisturbed during the operation. Each pump has two metallic teat-cups, E E, which are connected to elastic caps on knuckle joints, so as to be pliable and easily varied to fit the distances apart of teats in different cows. The teat-cups are peculiar, and are so formed inside as to fit the end of any teat, large or small, and are therefore suitable for different cows without requiring a change, which is a very important feature. As the rubber heads, A, of the pumps are drawn out by the handles, D, a vacuum is produced in the teat-cup, the milk then flows down into the pump, and as the india-rubber heads return to position, the milk is forced through the valves, Fig. 3, into the pail. The pressure then ceases upon the teat, as in hand-milking, and the milk flows down from the udder into the teat ready for the next pressure. This arrangement also enables the operator to disconnect the machine with ease at any time, and the application of the machine for milking is effected with the same facility. The fulcrums of the levers are so arranged that if the pail is held high or low, they will adjust themselves to suit the operator. The lever handles, C, can be put on and taken off in an instant, and the disk rubber heads, A, of the pumps can be readily taken off their sockets and easily stretched on again. The pumps, therefore, are easy of access for



washing inside. One-half of the pail is covered, and to this a handle is secured for carrying it. The whole forms a compact, neat and durable milking machine, and, with pail, only weighs 6½ pounds. It has been used daily for eight weeks, and the inventor states it does not injure the cow in the least, and they stand quietly during the process of milking as if pleased with the operation. The best time ever made with the machine was 12 quarts of milk in 1¾ minutes, 3 minutes being sufficient time and with much less labor than by hand. Machines will soon be in the market, and dairy-men can have a chance to prove the merit of this new cow-milker. A milking machine of simple construction, and capable of being readily applied, is certainly a desideratum for dairies; but to be practicable, it must be agreeable in its action to the cows themselves. This one is stated to be so, and it therefore deserves a fair trial by all who are interested.

Two patents have been issued for this machine, on the 22d and 29th of May last. More information may be obtained by addressing the patentee, L. O. Colvin, of Cincinnatus, N. Y.

Fig. 1



COLVIN'S IMPROVED COW-MILKER.

MARINE ENGINES.

Our transatlantic cotemporary, the London *Engineer*, recently published the following sensible remarks:—We can remember when it was considered a sure sign of good stokers and engineers if steam was always blowing-off at the valves, and the funnel vomiting forth huge volumes of "reek," black as Erebus, poisoning the atmosphere, and leaving a huge track of cloud for miles behind. If we were to take this as a test of the men being always at work, *i. e.*, "poking and stoking," there could be little doubt but they were so.

It was once considered a sure sign of a ship being a good sailer, if she pushed along in front of her a huge mountain of water, foaming and surging like the sea in a hurricane. This was called "carrying a bone in her teeth;" and most truly it was a bone, with "very little meat on it," as far as the profit of her owner went, and considering his pocket instead of his stomach.

Our engineers and stokers now, however, under the present system, and assisted by a little of that valuable though rather scarce commodity, common sense, are beginning to find that huge volumes of smoke pouring from the funnel, and clouds of steam flying from the valves, mean *coal;* and that the abuse of both in such a manner is not so satisfactory as the proper use of them—one in the furnaces, to make steam; and the other in the cylinders, to propel the ship.

Some twenty-five or thirty years since, a young and then comparatively unknown gentleman, by the use of a little of that before-mentioned commodity, common-sense, carried ont practically, by the aid of numerous and long-continued experiments, proved that the "bone in the teeth" was all wrong, and that, in fact, our ships had been steaming and sailing "wrong end first." This for a long time was not believed; but our far-seeing cousins on the other side of the Atlantic soon found out the truth of his researches, and the advantages arising from their practical application, by adopting the principle of construction he advocated; and in no case has its success and truth been more fully proved than in the celebrated yacht *America*, which "took the shine" out of our most famous clippers which were built on the old plan; and it is worthy of remark that the only vessel at all able to compete with her was a small vessel half her size, constructed on the same plan, by the originator of it; and it is now evident that, from the adoption of this principle, our steamers have risen in speed from 10, to 12, 15, 18, and are now expected to do 20 miles an hour!

We find that equal progress has been made in the construction of engines and boilers, and that such results are being daily and regularly attained in the working of engines in the merchant service as show that the same and in some cases a greater amount of work can be done by the use of half the quantity of coal. For instance, we find ships of 1,600 tuns displacement, with engines giving a power of 1,000 indicated horses, making regular voyages of 3,000 miles, at a speed of 10 to 11 knots, with the consumption of 300 tuns of coal; and that the regular working of these vessels is accomplished with the combustion of 3 lbs. of coal per indicated horse-power per hour.

THE GREAT RESERVOIR IN THE NEW YORK CENTRAL PARK.

From time to time we have kept our readers informed of the engineering works connected with the Central Park. We believe these details have been of general public interest, as certainly no other project of a like character can compare with this in point of extent and magnificence. In the center of this park is now located the receiving reservoir of the Croton Water-works, covering about 11 acres; this was a grand affair in its day, but it is a pigmy along side of its great successor, now in process of construction at the northern extremity of the park. The farmer who owns a hundred acres of land, and who has spent his lifetime in mowing and tilling it, if he has in addition only one or two wells upon it. 20 or 30 feet deep, may form some idea of the immense labor of excavating his whole farm to this depth. This process of digging one grand well for nearly a million people is now going on in this city, and the new reservoir will cover a space of about 106 acres. It is not formed, like other old ones, with straight rectangular sides, but its borders have a waving outline, giving it the appearance of a natural lake; and it is to be divided by an embankment, so as to allow the water of one half of the reservoir to be drawn off for purposes of repairs. It is also calculated to hold water sufficient to supply the inhabitants of the city for one month in case of any serious accident which would temporarily cut off the supply.

The taste which has directed the stupendous works of the Central Park is admirable. The rocks have been left in quite sufficient quantity to form an agreeable contrast with the extensive display of the works-of-art with which they will be surrounded; and, in all respects, this is an enterprise of which any city may well be proud. When the whole operations shall have been completed, and the trees shall have attained a size sufficient to shade the graveled walks, rambling beneath their branches and contemplating these beauties of nature in the heart of the city will be a source of the purest and highest enjoyment to the generations who will crowd in endless succession the streets of this busy metropolis.

THE FRUIT AND CROP PROSPECTS.—From all parts of this country the news is cheering with regard to the future grain and fruit crops. There has not been such a promise of peaches, apples and pears for several years past. The grain fields are luxuriant and will yield largely if not attacked with the midge. The Milwaukie *Sentinel* says of the north-west:—"In the memory of the oldest inhabitant, Wisconsin has never been blessed with so genial a season as the present Spring. It is the estimate of good judges that one-third more breadth of land has been sown to grain this Spring than any previous season. A good grass crop is already insured. The hopes of the farmers expand as they gaze upon their broad acres teeming with agricultural promise. The crop of last year was almost double that of 1858; and with a continuance of the present propitious weather, the crop of 1860 will show nearly an equal increase over that of 1859."

PEROXYD OF IRON FOR PURIFYING GAS.—In Denmark a native peroxyd of iron—a brown hydriated bog ore—is used in all the gas-works for purifying the gas. It is employed in the form of a coarse powder and is said to be superior to any other substance to remove all traces of sulphur from the gas. It would be well for some of our coal gas companies to try this substance, especially those which use the Pittsburgh or common Liverpool or Pictou coal.

LAC VARNISH FOR VINES.—Grape vines may be pruned at any period without danger from loss of bleeding, by simply covering the cut parts with varnish made by dissolving stick-lac in alcohol. The lac varnish soon dries, and forms an impenetrable coat to rain; it may also be applied with advantage in coating the wounds of young trees.

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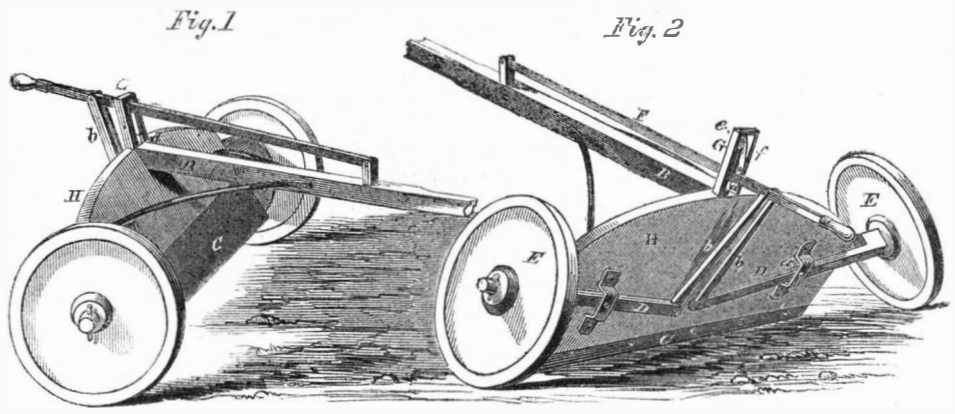
IMPROVED ROAD-SCRAPER.

The common road-scraper employed for excavating, filling up ruts, and otherwise grading roads, is a simple flat-bottomed scoop, tipped with iron or steel, with raised sides and a pair of handles by which to operate the implement.

The accompanying engravings illustrate a road-scraper, for which a patent was granted to Nelson Peck, on the 3d of January last, Fig. 1 being a side view, showing the scraper raised; and Fig. 2 a view showing the scraper in a position ready for excavating. This scraper is mounted on wheels, and is arranged in such a manner as to be raised and lowered by the movement of a lever, so as to be rendered operative and inoperative as desired; it is drawn with greater ease, and is operated with much less severe labor than the common scraper.

H represents a head-stock, to the upper part of which the draft-pole, B, is attached. The stock may be formed of metal, or heavy plank shod with metal, at its lower end. C is the scoop. D D are two levers, attached by fulcrum pins, *a a*, and the outer ends of these levers pass through and form the axles of the wheels, E E. To the inner ends of these levers are secured rods, *b b*, which are united to the lever bar, F, which works up and down in a guide, G, attached to the head of the stock. There is a projection, *d*, on the guide at one of its sides; at its top is a recess, *e*, and there is also a similar one, at its bottom. A spring, *f*, in the side of the guide, exerts its tension on lever handle, F, to hold it in either recess.



PECK'S IMPROVED ROAD-SCRAPER

When the scoop is not scraping the earth in front of it, the bar, F, has its back end near the handle held in the upper recess, *e*, of the guide, G, which holds up the scraper above the road, as shown in Fig. 1, the stock and scoop being elevated and the machine supported on the wheels. When the lever bar, F, has its back end near the handle lowered into the under recess of the guide, the stock and scoop are then depressed on the jointed levers, D D, as shown in Fig. 2; and when the machine is drawn along, the earth is scraped into the scoop, and when drawn to the spot where the load is to be deposited, the scoop is emptied of its contents by simply raising the handle of F into the upper recess, *e*. This action makes the front of the scoop assume a vertical position when the earth is discharged. The machine may be turned round to resume the same operations; or if the earth can be scooped straight forward, it may be drawn along and the handle depressed to take another load, and so on for continued operation.

This road-scraper, it will be observed from the foregoing description, is managed by the operator in scooping and dumping, by simply raising and lowering the handle, F. The scoop does not require to be thrown over; the labor is easy, and there is none of that jerking and hauling which is common in operating the common scraper. It is a little more expensive to make; but the facility with which it can be drawn from place to place, and the great amount of labor saved, should render it popular and deserving of favor.

For further information, address H. D. Graves or G. S. Potter, Ausable Forks, N. Y.

IMPORTANT IMPROVEMENT FOR INCREASING THE POWER OF STEAM.

Hitherto most of the methods adopted for superheating steam have resulted in the destruction of the pipes or vessels used for that purpose, from the very obvious reason that iron, over a certain degree of heat, decomposes steam and absorbs its oxygen, setting free hydrogen gas, and reducing the iron to a proto-oxyd.

Mr. S. N. Carvalho, of Baltimore, claims to have made a practical application of a well-known scientific fact, for the purpose of overcoming this great difficulty in obtaining purified *steam*, divested of the aqueous particles which are always present in steam used directly from the boiler. By an order from the Secretary of the Navy, Mr. Carvalho's apparatus has been erected and attached to the boilers of the Ordnance Department in the Washington navy-yard, where it has been in successful operation during the last fifteen days. It has demonstrated the important fact that, while formerly it was necessary to have from 35 to 40 lbs. of steam in the boiler to give 40 revolutions of the fly-wheel, the minimum power required to perform the work of the whole establishment—12 lbs. of steam in the boilers—passed through Mr. Carvalho's "Oxy-hydrogen Superheater," which produces 40 revolutions, while 14 lbs. gives 45 revolutions, and more effectually performs the work of the establishment, with a corresponding economy of fuel.

Messrs. A. and W. Denmead & Sons, of Baltimore, have successfully introduced the invention into that city, and have already contracted with the patentees for the sole manufacture of the apparatus for the State of Maryland. Messrs. James Murphy & Co., of the Fulton Works, will occupy the same position in this city.

The application is simple, practical, and of comparatively little cost, and can be attached to every description of boiler. A patent has been taken out in this country and applications are pending abroad, which latter fact prevents our readers from having the benefit of a full knowledge of the invention at present, but they shall have it "one of these days."

CHARCOAL AS A DISINFECTANT.

A lecture was recently delivered before the Society of Arts, in London, by Mr. W. E. Newton, in which he attributed various virtues to peat and other vegetable charcoal. He stated that, in the form of a powder, put upon poultices, peat charcoal had been most beneficially employed in some of the London hospitals, especially in cases of offensive sores. It absorbed the putrid effluvia, and was of great benefit in cancers, &c.. In many cases, when taken internally, it was productive of good effects in those troubled with disordered stomachs, such as heartburn, sick headache, palpitation of the heart and giddiness. In all diseases of the chest, sore throats, diptheria, or bronchial affections, peat charcoal has been found very useful. In France, a scientific commission, appointed by government to investigate this subject, has reported very favorably regarding the usefulness of this substance for a great number of purposes. A minute quantity of peat charcoal, in powder, boiled with some American corn starch and milk, has been given, with almost miraculous success (in London) for curing dysentery.

THE CHINESE SUGAR CANE IN EUROPE.

Experiments with and a complete analysis of the Chinese sugar cane have been made by Professor Voelcker. He found that, in the month of August, it was bitter and unfit for the feed of cattle, while in September it had become sweet—a sugar cane. He says:—"The taste of the plants on the 23d of August was anything but sweet. I caused a direct sugar determination to be made in a fresh and large quantity of the plant, but was unable to detect any sugar." And again:—"The Sorgham contained nearly six per cent of sugar on the on the 26th o. September; cattle supplied with this at that time greedily ate it, and to all appearance, did well upon it. The proportion of sugar in the whole plant is about the same as that in carrots." In Great Britain it is held to be inferior to clover—all things considered—for cattle feed. It takes so long to arrive at a proper condition for feeding that it will never answer in that climate, however well it may be adapted to warmer latitudes.

TIDAL MOTIVE POWER.

An exchange states that Dr. Seguin, of Paris, has proposed a novel and ingenious application of the tides as a motive power, applicable to machinery and agriculture. He proposes to construct, at the water side, two monster basins—one being furnished with gates permitting the entry of tide water, but preventing its exit—the other, having gates, permitting the exit of water, but opposing its entrance from the tide. By this means the first basin would be filled with water at high tide, and the other would be completely emptied to the level of ebb tide. A canal or race, being constructed between the two basins, would thus become the seat of a continuous current in one direction. By this means the alternating motion of the water will be converted into a continuous action, calm, as easily regulated and susceptible of the same applications as natural water-courses. The only question to be settled, in considering the applicability of this scheme, is its economy, and upon this point there might possibly be some doubt. Dr. Seguin, it is stated, proposes especially to apply this method to the purification of the Thames.

This very tidal power may be seen in practical operation every day within three miles of New York. Tidal wheels are quite common on the salt water creeks of Long Island, and have been in use for the last hundred years. In favorable situations they are useful; and in calling attention to the foregoing paragraph we may be doing service to several persons, as the plan may be carried out in many places along our more northern coasts, where the tides are high and capable of furnishing a variable water-power for a number of hours daily. A turbine wheel, constructed with adjustable buckets, may be the best adapted for such situations.

APPLICATIONS FOR THE EXTENSION OF PATENTS.

Straw-cutter.—George Catchpole, of Geneva, N. Y., has applied for the extension of a patent granted to him on the 5th of September, 1846, for an improvement in the above-named class of inventions. The testimony will close on the 6th of August next; and the petition will be heard at the Patent Office on the 20th of that month.

Steel-yard.—Thaddeus Fairbanks, of St. Johnsbury, Vt., has applied for the extension of a patent granted to him on the 15th of September, 1846, for an improvement in the above-named class of inventions. The testimony will close on the 4th of August next, and the petition will be heard at the Patent Office on the 27th of that month.

Separating Oleic and Stearic Acids.—James S. Gwinne, of New York City, has applied for the extension of a patent granted to him on the 3d of September, 1846, for an improvement in the above-named class of inventions. The testimony will close on the 6th of August next; and the petition will be heard at the Patent Office on the 20th of that month.

Bomb Lance.—Oliver Allen, formerly of Norwich, Conn., has applied for the extension of a patent granted to him on the 19th of September, 1846, for an improvement in the above-named class of inventions. The testimony will close on the 20th of August next; and the petition will be heard at the Patent Office on the 3d of September.

PEELING POTATOES.—All the starch in potatoes is confined very near the surface; the heart contains but little nutriment. Ignorance of this fact may form a plausible excuse for those who cut off thick parings in preparing potatoes for mashing; but none to those who know better. Circulate the injunction, "pare thin the potato skin."

WHILE the boiler that furnishes steam for the machine-shops of the New York road, at New Haven, is under going repairs, a locomotive is made to do service as a substitute. It is "jacked up" so as to take power from the driving wheels, as they revolve in the air.

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JOURNAL OF PATENT LAW.

A COVENANT NOT TO INFRINGE—A SLIGHT CHANGE OF MECHANICAL STRUCTURE IS NOT THE SUBJECT OF A PATENT, BUT IS AN INFRINGEMENT.

Where a defendant covenants not to further infringe an existing patent, and receives for entering into such covenant a valuable consideration, he will be enjoined by a court of equity from infringing, unless he shows some equitable reason why he should not be bound by his covenant. The application of this principle of patent law is illustrated in the case of Sargent *et al. versus* Larned *et al.*, decided in the first Circuit Court of the United States by Judge Curtis.

The alleged infringement for which the action was brought was upon a patent for a machine for paring apples, invented by Ephraim L. Pratt, and patented Oct. 4, 1853. There were two instruments executed by the parties, and, taking the two together, it appears that on Sept. 6, 1853, the defendant Seagrave received from the plaintiffs a qualified license to complete and sell certain machines, including the improvement for which Pratt's Letters Patent were issued; and in the May following this license was relinquished, and another, and a different license to sell certain of the said machines, was substituted, and Seagrave expressly covenanted to make no more of said machines after the date of said instrument; but it appears that he subsequently *did* so, although the defendant claimed that they were different in their construction from those covered by the plaintiff's patent, and consequently were no infringement. The counsel for the complainant insisted that the respondent Seagrave was estopped by his covenant from disputing the validity of the patent, and, in reference to this covenant, the court said: "If this was a valid contract, a court of equity will not allow Seagrave to violate his covenant and defend himself by attacking the validity of the patent. He must keep his covenant to desist from the manufacture, unless he shows some equitable reason why its performance should not be decreed. It is open to the defendants to allege and prove any facts which render a specific performance of the covenant inequitable, and great latitude is allowed to the covenanter who resists performance.

"It appears from the facts alleged in the answers relating to this subject, that Seagrave's machine was completed and put in use about nine or ten months before the date of Pratt's patent; that Seagrave had no belief that any patent could or would be granted for anything contained in Pratt's machine, and he told the plaintiffs that if a patent should be finally obtained, which would be valid at law, and he should continue to use it, he would make them a fair allowance therefor. An interference was afterwards declared by the Patent Office, between Pratt's and Seagrave's inventions; upon which Sargent and Foster and Seagrave met together and made an arrangement set forth and embodied in a partly-written and partly-verbal contract, dated Sept. 6, 1853. By this arrangement it was mutually agreed that Seagrave should withdraw all opposition to Pratt's claim and should petition the Patent Office to grant the said claim, which Seagrave accordingly did, and the patent to said Pratt issued immediately after. On the other hand Seagrave was to have the right to use the patented improvement upon as many machines as he had castings for, and it was further agreed that said Sargent and Foster and Seagrave might use each other's improvement.

"After this arrangement Seagrave went on making machines. Sargent and Foster received the patent of Pratt, and said Seagrave applied to the plaintiffs to have the verbal part of the contract reduced to writing' but they refnsed to do it, and Seagrave went on to finish up the machines. While at work on these machines, his own patent was issued, dated April 18, 1854.

"A new contract was entered into, May 26, 1854, whereby, in consideration of the complainants' buying, for $117, all the odds and ends and parts of machines which said Seagrave had on hand; they being machines containing the knife-holder loose upon the knife-rod, or, in in other words, containing Pratt's alleged improvement, said Seagrave agreed to give up all rights acquired by him under and by virtue of the first contract. In pursuance of this agreement Seagrave sold and delivered to the complainants all the parts of such machines as he then had on hand, and from that time it was alleged Seagrave ceased wholly from making such machines as contained said Pratt's improvement, and resumed the manufacture of machines previously patented by himself, adding other and further improvements, one of which was the mode of connecting the spring which draws the knife-rod towards the apple with the knife-rod itself. In no instance had the defendant Seagrave made a machine, since said last-mentioned agreement, having a knife-holder united to the knife-rod in the manner described in Pratt's patent.

The court, referring to the facts we have briefly stated, said: "The defendants have stated in their answer some circumstances which are relied on by their counsel as furnishing equitable reasons for preventing the interposition of the court. But it will be perceived that the defendants do not here claim the right to continue the manufacture, notwithstanding the covenant. On the contrary, the defense is a denial that the covenant has been violated, and my opinion is that if the facts alleged in the answer were proved, they would not affect the validity of the final agreement of May 26, 1854, which contains the covenant in question. If those facts were true, there was, at the date of the agreement, a controversy between the complainants and Seagrave, in which Seagrave was equitably right, and in the course of which the conduct of the complainants had been unfair; but, assuming this to be so, Seagrave, with a knowledge of all the facts, and under no duress, made the agreement for a compromise of May 26th, and then the complainants executed it on their part and bought the machines and parts of machines, and paid for them as agreed. The answer does not show any reason to suppose that the agreement was unconscientious or unreasonable. Seagrove cannot be allowed to go behind the agreement, especially when he retains the fruit of it. Moreover, there is no evidence of the facts alleged in the answer respecting these negotiations. The bill alleges that the agreement of May 26th was entered into by the complainants for the sake of avoiding litigation, and because Seagrave was not pecuniarily responsible. The answer does not deny either of these allegations. So far as the motives of the complainants for entering into the contract are concerned, and so far as respects the pecuniary responsibility of Seagrave, the answer is silent; and as to motive of Seagrave, the bill charges nothing. The answer goes into a history of negotiations and agreements which it alleges preceeded this agreement. But this is responsive to nothing in the bill, which contains no allegations concerning any such negotiations or agreements, nor respecting the state of the controversy between the parties, further than to say (what the answer, in substance, admits) that the complainants requested Seagrave to desist from making machines which violated their patent.

"Shortly stated, the case is this:—The bill alleges that a controversy existed concerning the violation of a patent, and that an agreement of compromise was made by the complainants, to avoid litigation, and because the defendant was not pecuniarily responsible. The answer says nothing of either of these points, but goes into a history of the controversy which was compromised. I am of opinion that it is not responsive to the bill and is not evidence, and that no sufficient reason appears why the compromise should not be executed on Seagrave's part. As to the other question, whether the machines made by Seagrave do include, in substance, the improvement for which the complainants' Letters Patent were granted, I am of opinion that the infringement is made out.

"The improvement patented consists in so attaching the knife-block to the rod which moves it as to allow it to rotate around the rod at right angles therewith, and thus the knife accommodates itself to any irregularity in the surface of the vegetable to be pared. The defendants, instead of making the knife thus movable on the rod, have made the rod movable in its socket. The knife-block has the same motion; but, in one, it is around the rod, in the other, it is with the rod. The change is so obvious and slight, and its practical effect so small, if it be anything, that I cannot consider it introduces a substantially new mode of operation, within the meaning of the patent law. It is one of those changes of form merely, or of mechanical structure, which would not be the subject of a patent without showing that some new or materially-improved result is obtained by it, which is not made out in this case. As against Seagrave, I think the complainants entitled to a decree for an injunction and an account. But Larned—the other defendant—is merely a workman in the employment of Seagrave. No decree for an account can be had as against him, for he has nothing to do with any profits; and upon the facts of the case I entertain doubts whether he ought to be enjoined, upon the footing of Seagrave's covenant. Unless the complainants elect to dismiss their bill, as against Larned, and take a decree against Seagrave alone, I must consider what is to be the effect of thus enjoining Larned."

INFRINGEMENT CASE.

UNITED STATES CIRCUIT COURT, BOSTON.

Before Judge Sprague and a Jury.

JUNE 11.—*Charles A. Eames vs. Aldrick S. Cook.*—This was a suit for infringement of a patent for an improvement in boot-trees, held by the plaintiff, and granted to him May 27, 1856. The parties both reside in Milford, Mass.

The boot-tree patented to the plaintiff was claimed to be so arranged and contrived as to be adapted to tree boots varying very considerably in sizes and pattern or style, and it was claimed that the mode of applying the force or stretching power to boots was such that its use did not expose the boots to be burst or torn, as was the case with trees previously in use, when worked by machinery.

The general issue was pleaded by the defendant, and under this plea the defendant denied that the plaintiff was the first inventor of the machine described in his patent, and contended that the same arrangement shown in the plaintiff's patent had existed in boot-trees previously made by Reuben L. Lewis, of Milford, and was shown also in boot-trees patented to Wm. Upfield in 1850, and to Jarvis Howe in 1848; and the Howe tree was relied on particularly, as containing the same arrangement and operating on the same principle as that claimed by the plaintiff in his patent, and the evidence in the case related mainly to a comparison of these two trees (Howe's and the plaintiff's) in respect to the construction and mode of operation of each, respectively.

Judge Sprague charged the jury very fully and clearly on all the points raised on either side, and analyzed the plaintiff's machine, as described in his patent, and those of Howe, Lewis and Upfield, relied on in defense, with reference to all the evidence in regard to each, and stated the bearing of all the evidence upon the various points in dispute, and the law applicable to the questions raised, with the dialectic skill for which the judge is so distinguished in cases relating to patents.

The jury found a verdict for the plaintiff, thus sustaining the validity of his patent, and assessed damages for infringement in the sum of $1,000.

POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE.

[Reported expressly for the Scientific American.]

On Thursday evening, June 14th, the usual weekly meeting of the Polytechnic Association was held at its room in the Cooper Institute, this city; Professor Mason presiding.

MISCELLANEOUS BUSINESS.

Bitumen.—Dr. Stevens read a paper on bitumen, giving an account of the origin, localities and properties of that remarkable substance. Asphaltum, coal, rock oil and burning springs have a similar vegetable origin; heat, pressure and chemical agencies accounting for all the specific differences. When all the mineral coal is exhausted, the doctor thinks that there will be found plenty of bitumen, for lighting purposes, to supply its place.

Japanese Paper.—Mr. Bruen exhibited samples of the paper in which the presents sent by the Japanese embassy to Mayor Wood were wrapped. The paper is of a light straw color and remarkably stout, being nearly as strong as calico. The fiber of the paper material is very long and resembles raw cotton.

The president here called up the regular subject —"Gas and Gas-burning," for the

DISCUSSION.

Professor Hedrick—Coal gas cannot be profitably made on a small scale, for the reason that the apparatus and the process are too complicated. Resin or oil gas, however, may be made at a moderate cost, the apparatus required is small and simple, and the gases, when generated, need only to be cooled to condense tarry matter, and to be washed with water, when they are fit for burning. Ordinary coal gas is a mixture of many gases

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and vapors, and the most valuable of these are the hydrocarbons. Among the substances considered as impurities are carbonic acid, carbonic oxyd, sulphide of hydrogen and ammonia; and of these, the most troublesome to remove is the sulphide of hydrogen. Carbonic acid and ammonia are readily washed out with water, but the sulphur compounds require lime. It is sometimes supposed that gas is destructive to books and pictures, and that it should not be used in reading rooms. But this is an unreasonable prejudice; the products of combustion of good gas are only carbonic acid and water.

The President—Has private gas-making been found practicable?

Professor Hedrick—Yes, but many families have found it too troublesome to make gas every day, and the apparatus is liable to get out of order by neglect and disuse.

Mr. John Johnson here made a grand display of burners in actual use, being set on a "float of lights" extending the whole width of the room. The whole number of burners exhibited was fifty; a large majority of these was of the stuffed or checked variety. A burner revolving on the Barker-mill or turbine principle was in rapid motion the whole evening. The Johnson and Stevens burner, of adjustable orifice, attracted a great deal of attention, being capable of yielding the smallest flame as well as a flame nearly a foot wide. But the most curious was a straight, thin and clastic tube, about three feet high. When this tube was upright and still, the gas burned like a candle flame; but when the tube was swung back and forward like a pendulum, the flame was white and brilliant only at the instant of rest at the extremities of the vibrations. In the dark, a bluish streak is seen, and alternating at the ends, a brilliant star. By swinging the tube in a circle or ellipse, interposing screens, &c., a great variety of curious effects are produced. Mr. Johnson described the peculiarities of the various burners, illustrating his remarks by experiments, and concluding with a condemnation of stuffed burners as a class.

The President—The main points to which we seem to have arrived in this discussion are:—1st. The yellowish flame is the most economical, and is yielded by gas burning at a low pressure from wide orifices. 2d. A large flame gives more light than when the same amount of gas is burned from two or more small ones. 3d. The great desideratum is a burner which will regulate the flow of gas automatically. Our New York gas is of excellent quality, and does not suffer in comparison with gas of other cities. It is better than the gas of London.

Mr. Seely presented some tables of experiments made to determine the regulating power of the Thompson burner. The comparison with the most approved of the ordinary burners showed that the Thompson burner performs well and regulates, with certainty and reasonable accuracy, within ordinary limits of pressure. At the present time this is the only true regulating burner before the public, and will come into use unless a better one can be devised.

Mr. Fisher—Why not have reflectors over our street lamps, so that one-third of our light shall not be wasted on the sky?

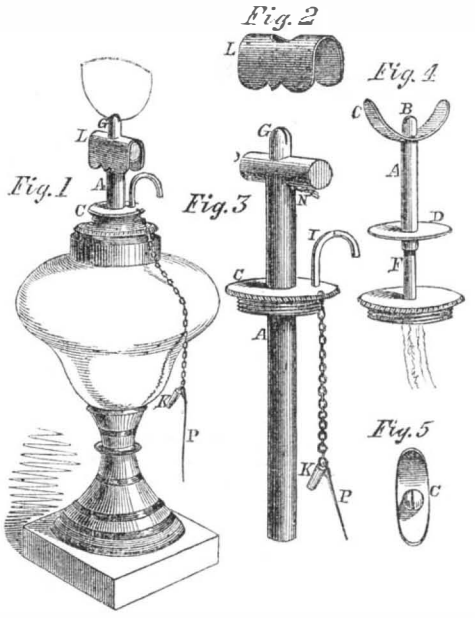
Subject for the next meeting: "The Theory and Value of Cut-offs."

GAS BURNER LAMPS.

The generation of vapor from a volatile hydro-carbon fluid in a lamp, and the burning of it in jets has been long practiced, In such lamps the fluid is drawn up to a heated surface by capillary attraction; and being converted into vapor by the heated metal, it issues through small orifices under a button and is burned like common gas. Such lamps are really Lilliputian portable gas-works, and are very cleanly and convenient. The accompanying engravings represent improvements on this class of lamps, for which two patents were granted on April 3, 1860. Fig. 1 is a perspective view of a lamp, Fig. 2 is a view of the vacuum chamber cap; and Fig. 3 is a view of the wick and fountain tubes, with the heating chamber. These illustrate the invention imbraced in one patent. Fig. 4 is a view of the wick tube and slide; and Fig. 5 represents a curved vaporizing plate embraced in the other patent. We will describe the two separately, so as to convey clear ideas of their nature and construction.

First: The lamp, Fig. 1, has a conducting tube, A, which passes down through the screw cap plate, C, to within three-fourths of an inch of its bottom, and its lower end is always beneath the surface of the fluid. D, is a hollow chamber screwed on the upper end of this tube near the orifice. There is a jet hole, N, on each side of the tube, A, immediately under the chamber, D. The burner-tip, G, is screwed or otherwise connected to this chamber. I is a curved air tube which passes through the plate, C, and communicates with the atmosphere and the interior of the lamp. L, is a cover for the hollow chamber, D.

When the chamber, D, is exposed to heat from a flame, a partial vacuum is created inside by rarification and escape of heated vapor. The air outside of the lamp then passes through the tube, I, and presses on the surface of the fluid in the lamp, forcing it up the conducting tube, A, in quantity commensurate with the heat or rarification at the chamber, D. It is therefore a fountain pressure lamp, and is different from one that is merely governed by capillary attraction. If the heat is too great at the chamber, D, one of the jets, N, may be stopped by the tapered plug, P, and when the lamp is not in use, the air tube, I, is closed by the plug, K. The tube, A, may be stuffed with wick in the usual manner. The fluid is generated into gas by the great heat maintained at the vacuum chamber, D, by the jets under it. The cover, L, protects the heating chamber



from currents of air so as to maintain a steady and uniform action, and we have been assured that a most steady and brilliant gas light is thus secured. The flame is thus raised above the top, without being depressed and drilled with a button as in the common vapor burners.

Second: In the ordinary fluid lamp a wick is inserted in the tube, F, in the usual manner. A slide, A, is provided to pass over tube, F, like a sleeve, and to this is secured the curved metal plate, C, the tip or burner, B, and circular plate, D. Allowing the lamp to be filled with fluid, and the flame of alcohol from a piece of wire-gauze or the flame of another lamp is held under the curved plate, C, the fluid in tube, F, minutely distributed in the wick, will be converted into gas by the heat, and it will ignite at the tip or burner, B. The flame of the burner will issue through the slit and follow the inner surface of the curved plate, C, up to its end, and by thus intensely heating this plate, the vapor is converted into pure gas, and a brilliant light obtained. The slide, A, may be raised by the plate, D, to diminish the volume of light as may be desired.

Perfect combustion is not effected in lamps unless the vapor of the fluid is converted into pure gas. In common vapor burners where the heat is not sufficiently intense below the outlet of the tube, some of the fluid is drawn up in the condition of mixed vapor and escapes without undergoing perfect combustion because it cannot be supplied with sufficient air. A loss of burning material is thus sustained in connection with a more feeble light. The high heat to which the vapor is exposed in the above lamps converts it into pure gas, thus saving material and giving a very bright light. The small burner may be lighted with a common match owing to the great heating surface of plate, C. These improvements have been applied to all forms of lamps, from the parlor chandelier to the common hand lamp.

More information may be obtained respecting them by letter addressed to Messrs. Hopkins and Anderson, patentees, at Easton, Md.

A COLUMN OF VARIETIES.

Gold is usually found in a solid metallic condition, when not distributed through quartz. At Sonora, Cal., however, some beautiful specimens of crystallized gold have been found; they are very rare productions.

At a late meeting of the Society of Natural History, held in the Medical College, this city, Mr. Morris presented specimens of boiler iron, crystallized by the action of fire, being portions of the boiler lately used in the Deaf and Dumb Institution. When placed in the building, the boiler was perfect, and of the best iron, but, by continual action of the heat, had become very brittle, so that a very slight blow would fracture it.

One of the most accomplished entomologists in this country is Mrs. Charlotte Taylor, of Savannah, Ga. She has contributed illustrated articles to *Harper's Magazine*, on the insects of the cotton plant, which are held to be the most learned ever published on the subject.

The French government have applied to the Academy of Medicine, at Paris, to ascertain the best means that can be adopted to put an end to the baneful effects of phosphorus on the men engaged in making lucifer matches. The Academy recommends that they should be made of pure amorphous phosphorus, or without phosphorus at all.

Sir J. F. Herschell, in a communication to the London *Photographic News*, directs the attention of photographers to the desirableness of discovering the art of taking photographic pictures with their natural colors. He says:—"I fully believe the problem will, one day, be solved; already we have a certain approach to it. I possess photographs in which the green of the foliage is unmistakably distinguished. In particular, a photograph of my residence, in which certain magnolias, trained against the brick building, and some other shrubs, have a fullness and decision of color which render it difficult to imagine that they have not been gone over with a brush, while the use of a magnifier shows that most certainly such has not been the case."

In the region of Oil Creek, Pa., the atmosphere is so saturated with oily vapor that, when an electric cloud comes over the oil springs, it is at once robbed of its noisy character, and descends quietly to those lubricating fountains in the shape of genuine "greased lightning."

A correspondent (Abraham Hardy) of the *Irish Agricultural Review* writes, in glowing terms, of dandelion salad, plain bread and pure water. He asserts that nothing can be better than these for the promotion of mental and bodily health. He expresses an experimental opinion, not a hypothetical sentiment, and he revels on dandelion salad as an ox on fresh clover. There is no accounting for tastes.

Kamptulicon is a substance manufactured from ground cork and india-rubber, and is extensively used in England for many purposes; it is proposed as a lining for the iron-plated war ships. An 8-inch shot fired through a block of this substance, one foot in thickness, did not make a single splinter, and the kamptulicon immediately closed upon the opening, so that no water could pass through.

A varnish made with one pound of sulphur boiled for half an hour in an iron vessel is a perfect protection from damp to brick walls. It should be applied with a brush, while warm.

To enamel iron articles, clean the surface; put on a composition of ground feldspar, quartz and borax; then fuse in a furnace. Black copal varnish may answer as a coating for cast-iron articles that are exposed to water. This varnish must be made with linseed oil and asphaltum.

Water-proof paper may be made as follows:—Take 2 ounces of alum and 1¼ ounce of white soap, and dissolve them separately in a pint of hot water for each. In another vessel, containing a pint of water, dissolve 1¾ ounce of glue and 1½ ounce of gum arabic; then mix the two solutions, heated over a fire. The paper is passed through this bath, then squeezed between rollers and dried. Or, the paper may be dipped in the solution, in sheets, then hung up to dry in the air.

The production of iron in Great Britain, in 1859, amounted to 5,600,000 tuns. In 1740, the whole product of iron was but 17,000 tuns. Cort's inventions of the puddling furnace and drawing rolls, with the use of Neilson's hot blast have revolutionized the making of iron.

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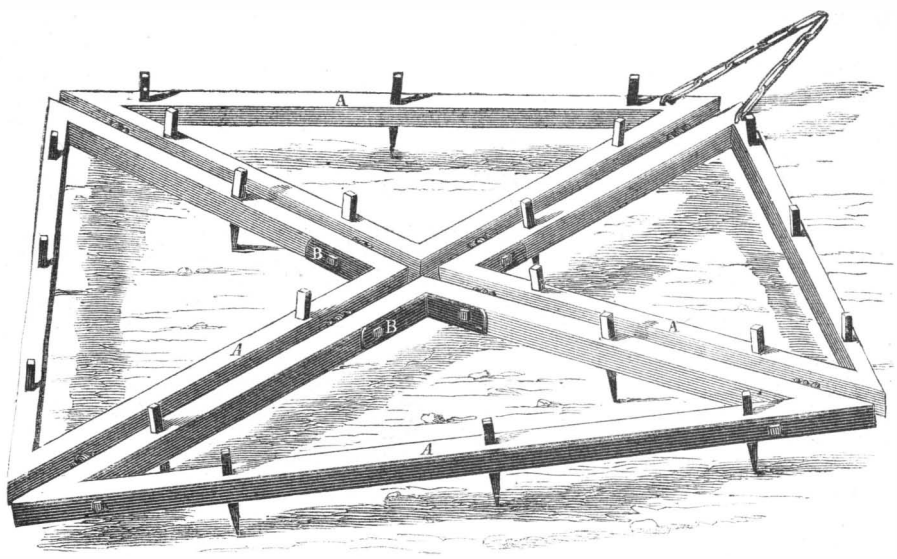
RUSSELL'S IMPROVEMENT IN HARROWS.

The harrow is one of the most important agricultural implements, as much depends upon the top pulverizing or dressing of the soil, both before and and after the seed is sown, for the success of the future crop. The accompanying figure is a perspective view of a harrow for which a patent was granted on the 17th of January, 1860. The value of the improvement consists in the construction and arrangement of the different parts, so as to accomodate itself to the uneven surfaces of the ground, as we shall further explain. The figure represents a square harrow composed of four triangular ones, A A A A, which are brought together as shown, and so combined as to make it very flexible to avoid obstructions. The miter joints are secured by bolts, B B; one end of each has a screw and nut, the other is provided with a strap of iron as shown. These four harrows are thus secured so as to be sufficiently flexible to accomodate themselves to all inequalities of the ground over which they pass.



RUSSELL'S IMPROVEMENT IN HARROWS.

The combined harrow is drawn by the chain, C, which is attached to the ends of two triangular ones, A A, in such a manner as to draw it in a wedge form to render its action better suited in overcoming obstructions than if drawn with a full square front. A shield of metal is usually secured to one of the harrows, and bent over in such a manner as to cover the opening between the two at the draft chain. This shield guides stubble and weeds to one side. This combination harrow is so simple that it is superflous to extend this description. It can be made cheap, strong and durable, and it is well adapted for harrowing either well-cleared or rough ground.

For more information address the patentee, Mr. John Russell, Grampian Hills, Pa.

NEW FILTERING MEDIUM.

A patent has lately been taken out in England, by Julius Dahlke, of London, for the following method of preparing combination charcoal plates for filters—a very meritorious invention.

About 50 parts by weight of animal charcoal, 25 parts of quartz in coarse powder (silver sand, for example), 17 parts of coal tar, and 8 parts of fire-clay, are combined as follows:—The fire-clay is first mixed with the coal tar, so as to be thoroughly incorporated; the quartz and animal charcoal (wbich is to be previously reduced to a coarse powder) are then added, and the whole mass is intimately mixed and reduced to a plastic state, when it is fitted to be molded or fashioned into shapes or articles as required. The articles so made are then exposed to a gradually increasing heat, in close vessels, in order to carbonize the tar, and produce the necessary solidity. When gas is no longer generated, and has been all evolved, the heat is increased until the vessels and their contents become red hot, and remain so for about three hours, then they are taken out, cooled and the plates (as they may be of cylindrical or other shape) so formed are employed for filters, they being porous and well adapted for removing impurities from water. Vegetable charcoal may be used in place of animal charcoal, and the plates so made employed in sides of refrigerators, for the preservation of meats, &c. These filtering plates may be enclosed in a cylinder and placed in the supply pipe of house cisterns; or used on board ships, through which to pump water before using it; as a filter to pass the water to drinking fountains, &c.

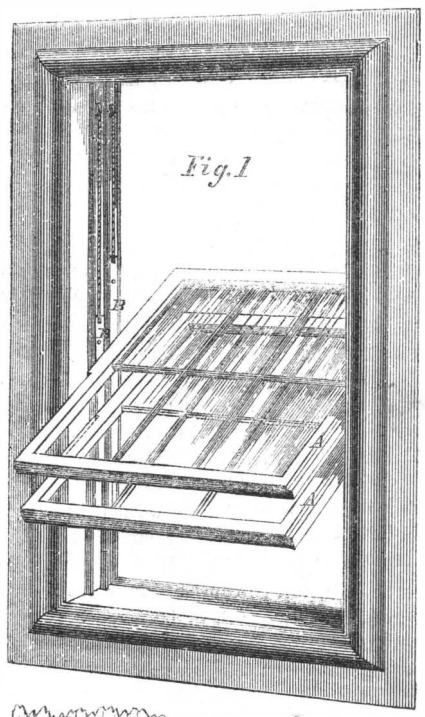
For large purifiers, such as the filtering-beds of water works, plates of prepared charcoal, cemented together, are laid down, so that the water must pass through the charcoal. These plates can be taken out, scrubbed and washed when they become foul; and they can also be roasted again in a close retort and rendered as good as when new.

A VEGETABLE substance resembling sheets of flannel is frequently found on the seashore of Long Island.

FRY'S IMPROVED MODE OF HANGING WINDOW-SASHES.

By the common methods of hanging sashes and securing windows in their frames, provision has not been made for the combined free movement of the windows up and down, easy access to the outside of them for cleaning the glass, a full open space for ventilation when required, and the retaining of the sash at any point—up or down—in proper position. All these desirable qualities are combined in the improvement represented by the accompanying engravings, Fig. 1 being a front view, showing how the upper and lower sashes may be swung and hung obliquely, and Figs. 2 and 3 are section views of the pivots on which the sashes rest.

Each sash, A, of the window is pivoted to a strip, B, at each side of the frame. These strips are con-



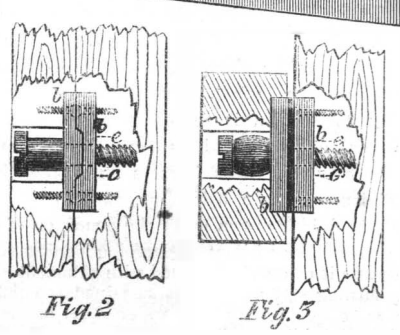


Fig. 2 Fig. 3

fined in the slide recess of the frame, and connected to balance cords and pulleys of the usual construction. By pushing up the window-sash, A, the strip, B, will slide up also, the same as a common sash hung on balance cords. As each window-sash is pivoted at the middle to the strip, B, it will be readily understood how it can be swung into the position shown.

But each sash has also the quality of retaining itself in place as shown. This is effected by the nature and arrangement of its pivots, as shown in the two minor figures 2 and 3. On one side of the window-sash, A, is a right-handed screw, *c*, Fig. 2, secured to it by a small metal plates, *b*, and upon the other side of the window-sash is a left-handed screw secured in a similar manner. On the sliding strips B B, at each side, are hollow screws or stationary nuts, *d*, adapted for receiving the solid screws, *c*; the latter form the pivots of the sash, and the hollow screws, *d*, are their sockets. By turning the window-sash, therefore, it will be held in the position shown, as provision is made with a piece of india-rubber for the strip, B, to accommodate itself to the motion of the screw pivots on which the sash can be made to turn. The plates, *b b*, of the hollow and solid screws, *c d*, may be formed as represented in Fig. 2 or 3, or the window-sash A, may be hung to the strips, B, by smooth pivots by having the surface of the plates, *b*, of such a form as to wedge and hold fast, when the sash is turned. Various modifications of the device for pivoting and securing the window-sash may be employed, all involving the same principles.

This improvement is also applicable to windows which do not have balance cords and pulleys. In this case the frame of the window is provided with a spring weather-strip, which runs along between the upper and lower window-sashes, and in this weather-strip there is a notch at each side to receive the edge of the sash. When it is desired to hold the windows obliquely, as shown in Fig. 1, the weather-strip at each side receives the sash and holds the window securely in position. The devices for effecting this are not all shown, but the operation will be readily understood from this statement.

By this invention the window-sashes are held firmly either in a horizontal or oblique position, and at a suitable point in the frame for free access of air and convenience of washing the glass inside and out. The advantages obtained by the simple and inexpensive devices and their arrangement for hanging window-sash, deserve general attention.

This invention was patented through the Scientific American Patent Agency on May 15, 1860, and measures have been taken to secure it in foreign countries. More information may be obtained by addressing the inventor, Thomas Fry, at 120 Fulton-street, Brooklyn, N. Y.

THE ORIGINAL STEAM FIRE-ENGINE.

MESSRS. EDITORS:—In a recent number of the SCIENTIFIC AMERICAN I noticed that you had given the credit to Cincinnati of introducing the first steam fire-engine. This honor belongs to the City of New York. In the year 1842, the Matteawan Company furnished the fire insurance companies of this city with a steam fire-engine; the conditions being that the engine should be drawn either by men or horses, and should throw water over the flag-staff of the City Hall. The machine was completed under the superintendance of an engineer named Hodge; and when put in operation, it threw a 1½ inch stream over the said flag-staff, and was approved by the city authorities. This engine was kept in Mercer-street in readiness for fires, and was instrumental in extinguishing a large fire in Dover-street near South-street, which so chagrined and annoyed the fire companies that it was found impossible to bring it into use, and the insurance companies sold it for other purposes. These assertions are facts which can be proved by reference to city records.

W. B. L.

New York, June 25, 1860.

CENTRAL PARK SWANS.—Eight of the twelve beautiful swans recently received from Hamburg, and placed in the pond at the Central Park, died on June 12th. It was at first thought that they had been poisoned, but a *post-mortem* examination failed to establish that hypothesis. The doctors were rather inclined to think that their death was caused by pleuro-pneumonia.

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VOL. III., No. 1.....[NEW SERIES.]....*Fifteenth Year.*

NEW YORK, MONDAY, JULY 2, 1860.

PROGRESS OF SCIENCE—THE PRESS AND PATENT LAWS.

N mental grasp and acuteness of intellect, in architecture, sculpture and great works of civil engineering, the ancients were not our inferiors. To whatever subject the Greeks and Romans devoted themselves intently, they arrived at great perfection; and, perhaps, if their minds had been directed to the necessity of inventing some great motive agent, the improved steam engine would have been the work of Archimedes instead of James Watt. But, although the human intellect has been the same in nature and power in all ages, yet it is accumulative in knowledge, and this leads to progress in invention. This is the reason why there are many arts and sciences in our day that were never heard or thought o by our ancient progenitors. It is an old and true saying that "Necessity is the mother of Invention," for, whenever a want is felt, the deep aspirations of nature are moved to supply it—and usually with success; hence, invention is truly the offspring of necessity.

Very great improvements have been made in science and art in our day, but the subject of greatest wonder connected with them is their rapidity of development. As much progress has sometimes been made in a few months in the present century, as in hundreds of years in the "olden times." We have no difficulty in arriving at the cause of this; it is the combined influence of the press and patent laws. These are the grand agencies for stimulating and encouraging invention, and thus impelling the car of Progress "onward with impetuous speed." Watt did not invent an engine for his own special use; Fulton a steamboat, Whitney a cotton gin, or Morse a telegraph; these were invented to supply public wants, and the press is the great agent for making these wants known. The *scientific press*, as a speciality, is the handmaid of progress in the useful arts. Of this, there can be no doubt—it is a fact founded on reason, and exemplified by the experience of everyday life. The SCIENTIFIC AMERICAN, as a personality, can testify to the truthfulness of these statements being corroborated by its experience of the past fifteen years. During that period, more valuable inventions in mechanism have been made than in thousands of years before the art of printing was known. The art of printing, by accumulating knowledge, permits every new generation to move forward from a higher elevation, because men of genius and inventors are now furnished with a knowledge of the discoveries made by others before them, and they are thus saved from wasting efforts in a wrong direction. It is thus that the scientific press is an economizer of public labor, as well as a teacher and friend of science and art.

One of our great specialities is the encouragement of inventors by patent laws as a just national institution for their protection. It requires no argument, because it is a self-evident fact, that the rapid advancement which our country has made in science and all the arts is due, in a paramount measure, to our patent laws. In a recent article in the London *Mechanics' Magazine*, on the manufactures of Switzerland, it says:—"It has been truthfully remarked that Switzerland has produced no eminent inventors. In accounting for this, Mr. Barnby—the British Secretary of Legation in that country—thinks we must look for the cause of this in the fact of there being no patent laws." We believe that no other fact can be adduced for this, and from it we derive a most important lesson. Switzerland is distinguished for the skill of her artists and mechanics in a great variety of manufactures; and, for intense industry, her people surpass those of every other nation. But they have made no great inventions; they have derived their improvements mostly from France and Germany, where inventions have been encouraged by patent laws.

All the great inventions which have been evolved by our countrymen were protected by patents. It was under the encouragement of our protective laws that their authors labored on in hope and with unremitting toil in the accomplishment of their grand designs. We believe, we are warranted in making the assertion that our distinguished inventors could not, and would not, have produced those improvements which have given them wealth and fame, unless they had been encouraged and protected by patent laws. In commencing a new volume, we look forward with animated hope to still greater achievements in science and art than have yet blessed the earth, because the mighty agencies of the Scientific Press and patent laws exert a more extended influence for good than they ever did before.

ECONOMY OF STEAM.

Everything that relates to this subject is of general importance, because the steam engine is so universally and diversely employed to subserve the purposes of commerce and the arts. It would naturally be expected that, with the advancement of knowledge and discovery, the opinions of scientific and practical men as to the best methods of applying steam would be more correct and uniform than heretofore. This, however, is not the case; the opinions of engineers and others who have devoted attention to this subject never were so various as at the present moment. Some believe that there is no gain in working steam expansively; while others as strongly contend that a saving of 50 per cent of fuel may be secured by expansive working. One believes that high-pressure steam is of vast advantage; while another asserts that low-pressure steam is equally economical, and much safer. Some believe that superheating the steam effects a great saving; while others contend that combined superheated and common steam surpasses all other conditions and arrangements for economy. A majority of those who are held to be high authority in engineering matters have, of late years, also advanced the theory that steam, when expanding in a cylinder, condenses into water in proportion to its rate of expansion, while there are a few who deny that such condensation takes place. These opinions are both various and contradictory; yet, among those who entertain them, a uniform sentiment prevails as to the small amount of power obtained in proportion to the fuel consumed for engines, thus admitting that there is great room for improvements.

As it regards the working of steam expansively, a paper was recently read before the Polytechnic Association, in which it was stated that experiments conducted at the Metropolitan Mills afforded evidence unfavorable to the advantages which are held to be gained by expansion, and we know that several engineers entertain similar views. That there is a decided gain to be obtained by working steam expansively is very easy of calculation. Thus: supposing we use steam of 80 lbs. pressure in a cylinder, and cut off at one-fourth of the stroke, we obtain an average pressure of 41.65 lbs. Unless there is a great loss sustained by condensation during expansion, it is evident, therefore, that there must be a saving of about 50 per cent of the steam.

The conclusion appears inevitable that, in every case where steam has been employed expansively without any apparent benefit, there has been some defect in the engine—such as unprotected cylinder and pipes or leaks by the valves. The new engines of the vessels belonging to the Pacific Mail Steamship Company (British), in which the system of expansion is carried out in a very superior manner, do the same work as the old engines, with about one-half the coal. We have been informed that one of the chief-engineers of the United States Navy has made trips in one of these steamers, for the purpose of acquiring information regarding their steam economics, and that he has presented a most able and favorable report on the subject to the Naval Board at Washington.

With regard to the employment of high-pressure steam, there is great economy when worked expansively. If steam, at 50 lbs. pressure, is cut off at half-stroke, it will exert an average pressure of 37.5 lbs.; while the same weight of steam at 25 lbs. pressure, without being cut off, will operate with a pressure of 12½ lbs less. In the former case, the steam is expanded in the cylinder; in the latter, it may be said to have been expanded in the boiler. If it absorbed power to generate steam in proportion to the pressure in the boiler, no saving could be effected in using it at a high pressure. In practice, it requires a little more fuel to raise steam under high than low pressures; but the gain of power is greater than the increase of fuel. The boiler is the source of power, and it is evident that, with high pressure and expansive working, there must be great economy, unless condensation takes place in the cylinder independent of pressure and temperature, which does not seem possible.

The liquefaction of steam by simple expansion is a new theory, claimed to have been discovered about the same time by Professor Rankine, of Scotland, and Clausius, of France. The former gives formulæ for calculating the amount of condensation in proportion to the expansion; and yet there has not been a single fact adduced in proof of such liquefaction of the steam. Steam does not liquify in any boiler until its temperature is lowered below 212°, a result which does not take place by expansion while the pressure is maintained above that of the temperature.

Various ideas are afloat regarding the meaning of *superheated steam*; but it will simplify the subject to adopt the definition of Mr. J. Frost, who, above all other men, deserves to be called its inventor. According to his description, it consists of "common steam subjected to a higher temperature than itself out of contact with water." By allowing steam to flow from a boiler through tubes exposed to a high temperature in the smoke-stack or in the furnace, it becomes superheated. The employment of such steam in cylinders in place of common or saturated steam effects quite a saving of fuel, and it is becoming quite common in England on board of steamers.

Another condition or method of employing steam, lately introduced, is the "Wethered system." It consists in using superheated and common steam in combination in the cylinders of engines. Mr. J. Wethered, of Baltimore, recently read a paper on the application and advantages of his system before the Institution of Civil Engineers (England), and on the 3d of April last an entire evening was devoted to its discussion by the members. As applied to the British screw frigate *Dee*, it was stated that the result of 20 experimental voyages gave, with combined steam, 500 H.P. in the engine; with superheated steam alone, 409 H.P; and with common steam, but 404 H.P. It was also stated that the combined steam had also been applied to a non-expansive engine, when the consumption of fuel fell from 35 to 24 cwt. per week. It was admitted by the members of the institution that the "Wethered system" effected a great saving of fuel in the steamer *Dee*, but it was held that the steam should not be superheated more than 100°, and that all the extra caloric it required was just a sufficient amount to permit common steam remaining dry to the end of its required expansion. In closing the discussion, it was stated, as the general opinion of the members, that the practical introduction of the system of superheating steam in England was greatly owing to the exertions of Mr. Wethered. He had succeeded in moving the British Admiralty when an English engineer could not have been so successful. This was also a subject of congratulation to them, as it was desirable, at all times, to give the greatest encouragement to foreigners, so as to attract the best talent.

Viewing the question of steam economics from various points, it appears evident that a great saving is effected by using high-pressure steam, superheating it, and then working it expansively in the cylinder. Boilers can be made to withstand a pressure of 100 lbs. per inch as easily as 20 lbs.; therefore, safety depends altogether on the construction of the boiler. A few years ago, it required about 6 lbs. of coal to a horse-power in steamships, but the *Persia* steamer consumes from 3.92 lbs. to 4.2 lbs. per horse-power now; while some steamers, built within three years, in which high-pressure and expansive-working are carried out, do not consume over

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one-half of this quantity per horse-power. We believe that the day is not far distant when 1 lb. of coal per horse-power will be all that is required, and engineers should labor to effect this result, for, theoretically, it it attainable. Such an achievement would effect a complete revolution in ocean navigation. The *Persia* consumes from 110 to 164 tuns of coal per day. When this amount (as it may be) is reduced to one-fourth, she would only consume 350 tuns for a voyage, instead of 1,402 tuns—the quantity which she has actually consumed in 10 days.

NEW ARRANGEMENTS AT THE PATENT OFFICE.

The Commissioner of Patents has established a special bureau to hear and determine Interference cases and applications for Extensions; thus relieving the Examiners and tending to render the decisions of the Patent Office in those cases more uniform than they have heretofore been. This arrangement is an excellent one, and has long been needed. Up to the present time it has been the practice to require the Examiners to take charge of and decide all Interference cases arising in their respective classes, subject to the approval of the Commissioner. But so greatly has the general business of the Office and the number of new applications made for patents increased, that the Examiners find themselves unable to give proper attention to Interferences and Extensions without neglecting or postponing other cases of importance. The bureau just established will therefore greatly relieve them.

The Bureau of Interferences and Extensions has been placed under the charge of Examiner Henry Baldwin, who is more particularly known at the Patent Office as Judge Baldwin. We regard this appointment as an excellent one. Judge Baldwin is one of the oldest and most experienced officers in the department, and he is fully qualified to discharge the important duties of the newly-created bureau with success.

Mr. John Van Santvoord succeeds Mr. Baldwin as Examiner-in-chief of that class which is composed of fibrous and textile inventions, which includes sewing, spinning, weaving and knitting machines. Mr. Van Santvoord has had much experience in this division, and the appointment is most judicious.

Mr. Adams takes the chief charge of the classes which embrace vapor lamps, medicines, hay rakes, winnowers and some other divisions. Mr. Adams is a careful and experienced officer.

Mr. Howell has been appointed an Assistant-examiner in the class embracing steam engines, &c.

Mr. Scheft is transferred to the division which comprises presses, railroads, &c.

The Patent Office—take it altogether—is, at the present time, in a highly flourishing condition; and its officers, with few exceptions, exhibit in their official views and actions a uniform and commendable liberality of disposition toward inventors. In these respects a very marked change has been observable within the last three years, which alteration we attribute, in a great degree, to the wisdom and firmness which has characterized the labors of the Board of Appeals. There has been no change in this board; the members are Messrs. Lawrence, Little and Rhodes.

No institution of the kind in the world presents a better organization or administration than that of the United States Patent Office as now constituted.

KNITTING MACHINERY.

It has long been a desirable object to obtain a machine which could knit a stocking "from top to toe" without a seam, and which would fit the foot as neatly and sit as easily as one knit by hand. This has at last been accomplished. On the 5th ult., we examined four unique knitting machines in the shop of Messrs. Raymond & Richards, in First-street, Williamsburgh, which knit at the rate of two pairs of entire stockings in nine minutes, as timed by our watch. One girl can attend four machines, and produce over ten dozen pairs of stockings per diem. Three threads are fed simultaneously on one machine to the needles, which are placed around a circular "former" or cylinder that is actuated to execute the difficult operations of forming the legs and feet alternately. The devices for accomplishing these results are ingenious and peculiar. The stockings are knit in a continuous web; the toe of one is finished when the top of the other begins, and by drawing out a thread, the one is separated from the other. Nominally, there is no waste of yarn, and the mechanism is strong and durable; and as the needles have no latches, they are not liable to break.

The American and European patents for these machines belong to the McNary Knitting Machine Company, of this city, and will not be sold at any price. The object is to license only fifteen factories in the United States, each making its own particular class of stockings, and all will be protected in the full and peaceful enjoyment of their rights.

Since the above article was written, we are informed that the machines referred to have been removed to Oldham (near Paterson), N. J., to the hosiery factory of Charles & William Hodges, who have contracted for machinery sufficient to make 500 dozen pairs of stockings per day through the whole term of the patent.

RECENT AMERICAN INVENTIONS.

The following inventions are among the most useful improvements patented this week. For the claims to these inventions the reader is referred to the official list on another page:—

PEN-HOLDER.

The object of this invention is produce a cheap pen-holder, which will allow of carrying the pen in the pocket without damaging the same, and which accommodates itself to any pencil, whether round or polygonal, and the invention consists in the use of an elastic tube with its noses, which form the socket for the pen, turned up or otherwise arranged in such a manner that a pencil or another cylindrical or polygonal stick can be put clean through said tube whether the pen is in the socket or not, so that when it is desired to use the pen, said tube can be pushed out to the end of the stick, and if it is desired to put the pen in the pocket, said tube together with the pen can be slid back, or the stick or pencil to such a position that the pen is protected. The inventor is A. F. Warren, of Brooklyn, N. Y., who obtained a patent for the same through the Scientific American Patent Agency.

DRAY.

This invention is an improvement in two wheel vehicles, particularly in that class known as the street dray, and used for transportation of boxes of goods, bales, barrels and like articles of a heavy and unwieldy character. It consists in attaching the shaft to the floor of the vehicle, by a king-bolt and a peculiar lock, so that when the dray is backed up in a narrow street to receive, or be discharged of its load, the horse may be turned round at right angles to the dray, out of the way of passing vehicles. The credit of this contrivance is due to H. M. Walker, of Watertown, Conn.

SHINGLE AND BOX MACHINE.

The object of this invention is to obtain a machine which will be automatic in its operations, for sawing up bolts into shingles, or slabs for boxes. The invention consists in clamping the bolts in a reciprocating carriage, that moves over a horizontal circular saw, which, at each movement of the carriage, saws off from the bolts a slab gaged to the proper thickness, by alternately releasing and confining the bolts previously to presenting them to the saw, adjustable gage tables being placed at each end of the machine. For shingles, the beds of the gage tables are set obliquely, and alternately change their obliquity from one side to the other, so as to give the shingles their proper tapering or wedge form. This invention was patented by E. T. Wheeler, of Cannelton, Ind.

SKATE.

The object of this invention is to remedy a serious objection attending the heel attachment of the skate patented December 20, 1859, wherein no provision was made to secure the skate against a longitudinal thrust of the foot. This improvement consists in forming an attachment by a vertical dovetail groove and tenon which will prevent the skate from casually getting detached from the boot, either by a lateral, forward or backward movement. This improvement was secured by additional Letters Patent to Thomas S. Whitman, of this city.

PORTFOLIO.

This invention consists simply in attaching to the inside of one leaf, of the portfolio two or three elastic cords which have flat needles on their ends, and affixing to the other leaf, inside, loops to receive the needles. The papers, letters, music, &c. &c., are secured in the portfolio by passing the needle through the marginal backs and through the loops, when the back scores of the leaves will be drawn close together by the elastic cords, and hold the paper smoothly in place making a self-holding, self-adjusting book-shaped portfolio. This device has been patented to J. N. Jacobs, of Worcester, Mass.

FENDER FOR DOCKS.

The object of this invention is to obtain a simple and efficient device for preventing vessels of navigation from being injured by coming in contact with docks, piers and the like, and one which may be readily applied, and readily adjusted when applied, to suit vessels of various hights, as well as to suit the depth of the water so that a proper protection may always be interposed between the vessel and the dock or pier, or other structure to which this invention is applied. The invention consists in the use of a frame, provided with rollers and suspended to the dock, pier, or other structure by means of chains and a windlass, the frame having elastic rollers attached to its inner side, and also connected to the dock, pier, or other structure. The patentee of this invention is Jacob Moomey, of Clinton, Iowa.

HEATING APPARATUS.

This invention consists in the combination with a stove or furnace having suitable provision for the admission of air, to support combustiou, and for the escape of the gaseous products thereof, of a chamber having a perforated top, and a reservoir for giving a properly regulated supply of oil or other inflammable or combustible liquid to the said chamber, to be burned as fuel above the perforated top thereof. The credit of this contrivance is due to Lyman Bridges, of Chicago, Ill.

BAGASSE FURNACE.

The object of this invention is to overcome the difficulty of stirring the fuel at the sides of the hearth and clearing the outlet, which exists in bagasse furnaces having their fire-chambers of circular form; and to this end it consists in the construction of the fire-chamber of the furnace of square or other polygonal form in its horizontal section, with its outlet at one angle, and with doors arranged at its other angles, for the introduction of rakes or pokers in such a manner as to provide for the clearing of the outlet, and the prevention of the choking of the draft, and for the stirring of the fuel on all parts of the hearth. The inventor of this improvement is Charles A. Desobry, of Plaquemine, La.

BACK PAY ALLOWED.—Several of the Examiners at the Patent Office, though nominally appointed as assistants, have, in fact, for some months past, discharged the duties of Chief-examiners. Congress has lately passed a bill giving them back pay as Chief-examiners from the day of commencing such service. Good

THE broom business is active in Hadley, Mass., and the adjoining broom corn towns. The brush is now all in the hands of the manufacturers, who paid eight to nine cents per pound for it, and find a ready sale for their manufactured results.

NEW BOOKS AND PERIODICALS RECEIVED.

ST. PAUL'S TO ST. SOPHIA, OR SKETCHINGS IN EUROPE; by Richard C. McCormick, author of "The Camp before Sevastopol," "The Italian War of 1859," &c. Sheldon & Co., publishers, No. 115 Nassau-street, this city.

There was a time when books of European travel were not only valuable but eagerly sought for. Then, comparatively few Americans went to Europe, and almost every one who did go seemed to think it a duty to write a book of travels. The facility of semi-weekly steam ocean navigation, bringing us within nine days of Europe, has quickened the spirit of travel so much in that direction that an European voyage now surprises no one. Books of travel have, of course, largely multiplied, and, for the most part, are not of much interest or account; in fact, we seldom think it worth our while to look at these ephemeral publications, much less to undertake to read them. The book in hand is an exception to the general rule. It is an entertaining and lively production, and will well repay a perusal. The author is an observing gentleman, and has the right sort of elements to produce an interesting and unobjectionable work.

DICKENS' GHOST STORIES; T. B. Peterson & Bros., publishers, Philadelphia.

These stories, numbering 31, have never before been published in this country. They relate to a great variety of topics, and even the inventor has his experience in obtaining a patent humorously told. We gave an excellent extract from this story on page 373 of our last volume. All the sketches are entertaining, and are told in Dickens' best vein. The above publishers have issued several different editions of Dickens' works.

NORTH BRITISH REVIEW; Leonard Scott & Co., publishers, No. 54 Gold-street, this city.

The present number of this able quarterly contains nine original essays, besides its usual minor reviews of current literature. It contains one scientific article, by Sir David Brewster, on "Scottish Lighthouses," which is the fruit of a little controversy between him and the Stevensons, engineers of the lighthouses. To this subject we shall revert at some future time.

BLACKWOOD'S MAGAZINE (by the same publishers) for this month is a splendid number. It contains articles on the "War in China," the "Life of Wellington," "Captain Speke's Adventures in Africa," and several others—all evincing marked ability.

HOE'S ILLUSTRATED CATALOGUE; the most beautiful illustrated catalogue of machinery that we have ever examined has just been issued by Messrs. R. Hoe & Co. It contains illustrations of the printing presses manufactured by them in their establishments at Boston and in this city. Messrs. Hoe & Co., are the most extensive manufacturers of printing presses in the world, and they now own the entire right of the Adams patent printing press, which they make principally in Boston.

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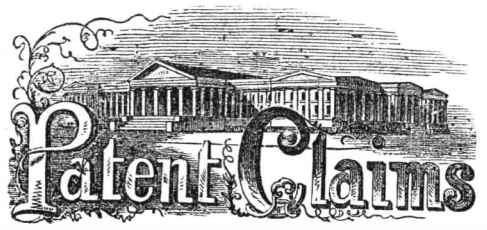

ISSUED FROM THE UNITED STATES PATENT OFFICE
FOR THE WEEK ENDING JUNE 19, 1860.

[Reported Officially for the SCIENTIFIC AMERICAN.]

*** Pamphlets giving full particulars of the mode of applying for patents, size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN New York.

28,723.—Harry Abbott, of North Huron, N. Y., for an Improved Churn:

I claim the combination and arrangement of the dashers, E E, guided in their motions by the vertical grooves, b b, and inclined grooves, i i, or their equivalents, with the auxilliary counter acting dashers, G G, constructed and operating substantially as and for the purposes specified.

28,724.—Wm H. Allen, of Brooklyn, N. Y., for an Improved Steam Pressure Gage:

I claim the combination of the two cylinders, B, pistons, C C, and adjustable crosshead, D, with the central indicating rod, G, spring, E', and spring box, E E, in the manner and for the purpose shown and described.

I also claim the arrangement and combination of the caps, H H, in combination with the plate, G, and cylinders, B B, as shown and described, so that said caps will serve to cover the cylinders, B B, to guide the piston rods, b b, and also to confine the plate, G, all as set forth.

[This invention consists in a certain arrangement of a spring and a box in which it is isolated in combination with two pistons working in parallel cylinders, and having their rods connected with a cross head to which is attached an index working against a fixed graduated scale, the whole constituting a simple, durable and effective pressure gage for indicating the pressure of steam in boilers, or of water in pipes or vessels, or of fluids in various conditions.]

28,725.—Edward Andrews and John H. Carr, of Palo Alto, Pa., for an Improvement in Lubricating Journals:

We claim, first, The pad, E, and spring, D, when used for the purpose as fully specified and described.

Second, The combination and arrangement of the plug, F, valve, H, cross-piece, J, air escape, O, and guard piece, M, constructed and operated substantially as and for the purpose specified.

28,726.—David Baker, of Harwich, Mass., for an Improved Spout and Lid of Pitchers:

I claim the combination and arrangement of the channel, a a a, the lid, B, the outer lid, A, and the lever, C, substantially as and for the purpose specified.

28,727.—Samuel Barley and J. H. Barley, of Longwood, Mo., for an Improvement in Harvesters:

We claim, first, The arrangement of the rake bar and head, e' e'', to operate in combination with the guard plate, S, crank, d', shafts, C C, and platform, I, as shown and described.

Second, We do not claim, broadly, the invention of the divider, but we do claim the arrangement of the horn-shaped divider, T, to revolve, so that it can be adjusted to any desired position, in the manner shown and described.

[This invention consists in a novel arrangement of parts, whereby many advantages are obtained by very simple means.]

28,728.—Henry Barringer, of Wataga, Ill., for an Improvement in Upsetting Tires:

I claim the combination of the movable segment clamping lever, D, rocking piece, F, block, G, and clamping portion, H, when arranged in a manner to produce the result set forth.

[This invention consists in pivoting the lower clamping lever that is to be operated by treadles to a sector plate that moves in suitable guides in the frame-work of the machine, and in attaching one end of the bearing or clamping block to this plate in such a manner as to move with it, and in arranging in a sliding block in such a relation to the clamping movable block, plate and lever that the machine may be adapted to tires of any width or diameter with great facility. The clamping devices are constructed in such a way that they may be rigidly fixed in any desirable position to which they may be adjusted.]

28,729.—Lafayette Bartoo, of East Aurora, N. Y., for an Improved Sash-fastener:

I claim the spring stops, C and C', having the catches, f and h, for the combined purposes as specified.

28,730.—C. F. Baxter, of Boston, Mass., for an Improvement in Furnaces:

I claim, first, The combination of a double cylinder steam generating fire-pot, with pipes, E E, substantially as described and for the purposes set forth.

I also claim the arrangement of the steam-generating fire-pot, F, to stand apart from, but within the inner wall, J, of the hot-air chamber, H, so that the exterior surface of the fire-pot will be constantly surrounded by the hot products of combustion, as shown.

I also claim the arrangement of the oven, G, directly above the fire-pot, F, but within the inner wall, J, of the hot-air chamber, H, as shown.

28,731.—S. A. Beers, of Brooklyn, N. Y., for an Improvement in Iron Rails for Street Railroads:

I claim the construction and use of a box or coping rail for street railroads of such width as to accommodate a car and carriage track, in combination and of such depth as to give strength to the rail, whether the same is laid with or without a continuous string piece, constructed substantially as described.

In combination with the rail constructed substantially as described I also claim the wedge and cleats, for the purpose set forth in the accompanying specification.

28,732.—Albert Bigelow, of Hamilton, C. W., for an Improvement in Steam Plows:

I claim first, The arrangement with the main supporting frame, N', and with the endless chain, D, and plows, C C C, of the auxiliary radius, frame, Q R, wheels, F, transverse shaft, O, and longitudinal shaft, A, substantially in the manner and for the purposes described.

Second, The arrangement of the chains, E, radius frame, Q R, and adjusting mechanism, G G1, G2, G3, substantially as and for the purposes set forth.

28,733.—S. F. Brooks, of Weston, Mass., for a Game-box:

I claim the box, A, with its frame and glass plate, in combination with the drawer, B, and its furniture, as set forth, for the purposes specified.

[This invention consists in constructing a flat-box with a neat frame round its edge, and a glass top; and in furnishing such a box with a drawer, divided into a number of apartments for receiving the pieces to be used in playing at cards, dominoes, checkers, &c. The box is provided with game boards covered on one side with pictures, which, on being placed within the frame and the frame hung up, will give the box the appearance of a picture frame.]

28,734.—J. M. Carlisle, of Greenwood, S. C., for an Improved Machine for Sawing Shingles from the Bolt:

I claim the employment or use of the two saws H I, having respectively oblique and parallel cutting planes relatively with the end of the bolt, O, in connection with a rectilinear feed movement of the bolt, all being arranged and operated substantially as and for the purpose set forth.

27,735.—C. B. Carpenter, of North Attleboro', Mass., for an Improvement in Watch Chains:

I claim my improved manufacture of jeweler's chain, as constructed with each link having two arms, a a, two scales, b b, and a connection, c, arranged and applied to a succeeding link, as described.

28,736.—James Chesley, of Concord, N. H., for an Improved Boot and Shoe-cleaning Apparatus:

I claim the arrangement of the frame, A, the brushes, B and C, and E, the scraper, D, the spaces, a, and the draw, H, substantially as and for the purpose specified.

28,737.—C. W. Clewley, of Providence, R. I., for a Method of Constructing Rims for Watches:

I claim the use of a combined die and cutter, D, and a plunger, A, in combination with the same, or their equivalents, the two so combined, operating in the manner substantially as described for the purposes specified.

28,738.—Cornelius Collins, of Brooklyn, N. Y., for an Improvement in Machinery for Making Wire Rope:

I claim the combination of the standard, B, fixed crank, C, disks, D and E, cranks, F, and reels, R, the whole being arranged and operating in the manner and for the purposes set forth.

28,739.—E. M. Corbett, of New York City, for an Improvement in Photographic Cameras:

I claim, first, The combination with the plate-holder, G, of the double combination slide, D, constructed and operating substantially as and for the purpose set forth.

Second, Arranging the main slides, d d', of the slide, D, with central rails, f f', substantially in the manner and for the purpose described.

Third, The arrangement and combination of the double adjustable lenses, E, slides, e e' e' e'', and adjustable plate-holder, G, constructed and operating substantially in the manner and for the purpose set forth.

28,740.—C. W. Crosley, of New York City, for an Improved Fire-escape:

I claim the application to large canvas tubes of metallic and india-rubber bands, which will gradually stretch at a given pressure, and allow the person entering the tube to escape from the burning building without the slightest injury, as described, using for that purpose the metallic and india-rubber ring or band, or any other substantially the same, and which will produce the intended effect.

28,741.—C. A. Desobry, of Plaquemine, La., for an Improvement in Bagasse Furnaces:

I claim the arrangement of the outlet, B, and the openings, f f', in combination with each other and with the square or polygonal fire-chamber, substantially as and for the purpose set forth.

28,742.—William Dougherty, of Philadelphia, Pa., for an Improvement in Machines for Grinding Saws:

I claim the block, G, with its inclined sides, in combination with, and arranged in respect to, the two revolving grindstones, E and E', when a vertical as well as horizontal reciprocating motion is imparted to the said block, G, by the devices set forth, or their equivalents.

28,743.—J. B. Duff and T. W. Keating, of New York City, for an Improvement in Machines for Measuring the Strain on Pulley Belts:

We claim the uniting the ends of the belt by an elastic material placed on a clasp or fixture constructed with arms attached to the belt and indicator and scale, in the manner and for the purposes described.

28,744.—A. K. Eaton, of New York City, for an Improvement in the Treatment of India-rubber:

I claim the combination of oxyd of aluminum with sulphur and caoutchouc or allied gums, and the treatment of the compound in the manner substantially as specified.

28,745.—William Fuzzard, of Charlestown, Mass., for an Improvement in Surfacing Fibrous Materials:

I claim the employment or use, in connection with a heated surface, of an apron formed of any textile or other similar or suitable fabric, as a vehicle to convey and discharge on the fibrous web the surfacing compound or material.

[This invention relates to an improvement in "sizing," or applying a glue or adhesive compound or substance to the surfaces of fibrous materials—such as cotton wadding—which operation is technically termed "surfacing."]

28,746.—Joseph Geiermann, of Albany, N. Y., for an Improvement in Sewing Machines:

I claim the combination of two shuttles and one needle, operating together so as to form with three threads a stitch, substantially as described and in the manner specified.

28,747.—E. P. Gleason, of Providence, R. I., for an Improved Die-plate for Cutting Screws:

I claim combining with such die-plates the guiding jaws, 1 1 1 1, or their equivalent, in the manner and for the purpose specified.

28,748.—Wm. D. Grimshaw, of Newark, N. J., for an Improved Hot-air Engine:

I claim the employment of the solid metallic packing, I, in the manner substantially as shown and described, so that when a sufficient degree of heat is applied to the engine, the packing will melt and remain in a fused state until the heat is withdrawn, as set forth.

I also claim the heating of the air or steam by bringing it in contact with the fused metallic packing, I, substantially as and for the purpose shown and described.

I also claim the covering of the fire chamber, C, with the metallic packing, I, which fuses on being heated.

I also claim the combination of the pipe, E, cylinder, C', piston, F, and packing, I, in the manner and for the purpose shown and described.

I also claim the introduction of air or steam between the surface of the fusible packing, I, and the interior of the piston, F, substantially as and for the purpose shown and described.

28,749.—E. J. Hale, of Foxcroft, Maine, for an Improvement in Lamps:

I claim my improved wick-retainer, as made, not only with a spring clasp by which it may be readily attached to, or detached from, the cap, as described, but so as to extend up through the lower end of, and into, the wick tube and against the wick, essentially as specified.

28,750.—J. P. Hayes, of Philadelphia, Pa., for an Improvement in Making Plumbers' Joints:

I claim a mold or case provided with a secondary chamber, f, to operate substantially in the manner and for the purpose set forth and described.

I also claim, in combination with a mold or case adapted for making plumbers' joints in pipes by the process of melting the ends of the said pipes, as described, the employment of a tubular protector, C, as and for the purpose specified.

28,751.—Wm. A. Herrick, of Leeds, Maine, for an Improvement in Coupling and Uncoupling Cars:

I claim the combination and arrangement of the levers, c c and e e, constructed and operating substantially as described in the specification.

28,752.—C. W. Higgins, of Somerville, Mass., and A. S. Willard, of Charlestown, Mass., for an Improved Clothes-wringer:

We claim the arrangement and combination of the sliding shaft of pinion, D, with pinion, E, for operating the bag, B, substantially in the manner and for the purpose set forth.

28,753.—C. J. Hobe, of New York City, for a Machine for Bundling Fire-wood:

I claim, first, The employment of a reciprocating knife, C, more or less curved, in combination with the relatively-shaped hollow bottom of the hopper, B, both operating together, for the purpose of gathering, cutting-off, and thus forming conjointly between them a bundle of wood of the size and shape required; the whole substantially as described.

Second, The employment of the conical or tapering hole, f, substantially as described, as a simple means for effectually compressing within it the aforesaid loosely-gathered bundle, and to firmly hold it while receiving the cord.

Third, The combination of said hole, f, and the plunger, E, for forcing the bundles into and through said hole, arranged and operating substantially as described.

Fourth, The method of arranging the cords, h, on an adjustable sleeve, G, and fixed drum, H', or their equivalents, substantially as described, enabling the operator to quickly adjust a large number of cords at a time, and to have them at hand in such convenient position, so that said cords can be readily passed, one after another, on to the cord-carrier, H, when required.

Fifth, The arrangement of the reciprocating tubular cord-carrier, H, and the combination of the same and the fingers, I, constructed and operating substantially as and for the purpose set forth.

Sixth, The arrangement of the doubly-flanged bundle-remover, K', attached to a vibrating arm, K, or its equivalent, when operating as and for the purpose specified.

Seventh, The arrangement and combination of the knife, C, hopper, B, hole, f, plunger, E, drum, H', and sleeve, G, cord-carrier, H, fingers, I, and bundle-remover, K', constructed and operating substantially in the manner and for the purpose specified.

[This invention consists in a certain arrangement of parts for forming the bundles, for retaining them ready to receive the cords, and for carrying the cords and bringing the same over the bundles in such a manner that the pieces of wood which are fed into the machine are thrown out in bundles of the required size.]

28,754.—H. S. Holmes, of Lynn, Mass., for an Improvement in Congress Boots:

I claim securing the edges of the gores to the gaiter tops and lining by a seam common to all, in the manner and for the purpose substantially as set forth.

28,755.—J. N. Jacobs, of Worcester, Mass., for a Portfolio Newspaper File:

I claim the combination with the two boards when attached together by a back, B, as set forth, of the cords, D D, attached to the edge of one board, eyes, G G, attached to the edge of the other board, and the elastic straps, E E, forming a self-holding, self-adjusting, book-shaped portfolio, substantially as set forth.

28,756.—Jabez Jenkins, of Philadelphia, Pa., for a Composition for Lining Safes:

I claim the employment of copperas or sulphate of iron, mixed with plaster-of-paris or some other suitable material, in the manner described, for the purpose set forth.

[This invention consists in the employment of powdered copperas or sulphate of iron, either alone or mixed with plaster-of-paris or some other suitable material, for the purpose of lining fireproof safes.]

28,757.—S. A. Kerr, of Arbor Hill, Va., for an Improved Churn:

I claim the manner described and shown of arranging the blades or slats, a a, on a vibrating or turning dasher-staff, for the purpose set forth.

28,758.—Rufus Lapham, of New York City, for an Improvement in Blowers:

I claim the application of an india-rubber or flexible tube, closed at both ends elliptically and held and operated upon by plates and a lever, substantially as and for the purposes set forth.

28,759.—T. R. Markillie, of Winchester, Ill., for an Improvement in Plows:

I claim the arrangement of the plow or plows as connected to the truck, in combination with the levers, G and L; the whole being constructed and operated in the manner and for the purposes described.

28,760.—J. P. McLean and P. A. Morley, of New York City, assignors to P. A. Morley aforesaid, for an Improved Egg-beater:

I claim the arrangement and use of corrugated or twisted beaters, b b' b'' b''', in combination with the cylinder, e, and operated in the manner and for the purpose set forth, and shown in the drawings at Figs. 1 and 2.

28,761.—James McGlensey, of Philadelphia, Pa., for an Improvement in Gas-burners:

I claim the arrangement of the cover, D, provided with holes in the top to spread the flame, with the tube, B, the jet, A, and the holes, C C, when used in the manner and for the purpose set forth.

28,762.—R. S. Merrill, of Lynn, Mass., for an Improved Coal Oil Lamp:

I claim the adaptation to the said wick tube, and arranged in a plane parallel with, and at a suitable distance from, its border, of one or more flanges, constructed substantially as described, to operate in the manner and for the purposes set forth.

28,763.—F. I. Miller, of Brooklyn, N. Y., for a Cigar Rack for Hats:

I claim, first, The cigar hat-rack, constructed and applied in substantially the manner described and shown.

Second, I claim the clasps, b, constructed and operating as set forth, when applied to a hat-rack for cigas, for the purposes and as specified.

28,764.—Henry Mitchell, of Cincinnati, Ohio, for an Improvement in Sprinkling Attachment for Railroad Cars:

I claim the combination of the tanks, H H', sprinkling tubes, I J valve, K, and brake gearing, E F, arranged and operating substantially as and for the purposes set forth.

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28,765.—Jacob Moomey, of Clinton, Iowa, for an Improvement in Fenders for Docks, Wharves, &c.

I claim, first, The employment or use of a frame or fender, B, provided with rollers, D, and suspended from a windlass or other fixture at the top of a dock, pier or other structure, when said frame or fender is provided with india-rubber rollers, E, at its inner side, to operate substantially as and for the purpose set forth.

Second, The peculiar manner of attaching the india-rubber rollers, E, to the inner side of the frame or fender, B, namely, by means of the springs or elastic staples, F, to operate as and for the purpose set forth.

Third, The connecting of the frame or fender, B, to the dock, A, by means of the chains, k, and slides, j, substantially as described.

28,766.—Wm. A. Morse and D. S. Beans, of Boston, Mass., for an Improved Spring Bed Bottom:

I claim the arrangement of the hooks, C, elastics, D, and metal frames, F, as shown, for the purpose of attaching the slats, E, to the rails, B, of the bedstead.

[This invention relates to an improvement in that class of spring bed bottoms in which wooden slats are used in combination with elastic attachments. The object of the invention is to obtain a simple connection of the elastics to the rails of the bedstead, so that the elastics may be easily attached to, and detached from, the rails without injury; the invention also having for its object the permanent attachment of the elastics to the slats, and in such a way as to insure a perfect attachment along the whole width of the elastic, and thereby subject it to an equal strain or tension throughout its entire width.]

28,767.—Benjamin Morrison, of Philadelphia, Pa., for an Envelope:

I claim an envelope provided with an opening or openings through which the usual postmark or marks may be imprinted or stamped, as heretofore, directly or exclusively upon the letter or document enclosed therein, substantially as set forth and described.

28,768.—Jehiel Munson, of Burlington, Vt., for a Composition for Paste for Attaching the Coverings to Pianoforte Hammers:

I claim, first, The composition from the materials, and in the manner described, of an adhesive composition or paste.

Second, The application of such paste for the purpose of attaching to the whole face of the felt with which pianoforte hammers are usually covered, the leather by which they are protected from the action of the strings.

28,769.—H. G. C. Paulson, of New York City, for an Improvement in Clarifying Sugar:

I claim the application of a temperature above the boiling point under atmospheric pressure of said combined liquors, as stated, to raw sugars or the concentrated juices of sugar-bearing plants, for the purpose of clarifying and defecating said raw sugars.

28,770.—Walter Peck, of Rockford, Ill., for an Improvement in Windmills:

I claim, first, The combination of shoe, N, pitman, L, arm, F, spider, E, and spring, e, or its equivalent; the whole arranged and operating as described, for the purpose set forth.

Second, I claim, in connection with the above-claimed combination of devices, the employment of an atmospheric governor, S, substantially as and for the purpose described.

28,771.—O. Z. Pelton, of Middletown, Conn., for an Improved Beer Pitcher:

I claim a beer pitcher having a movable froth partition, with a curved top and a lid provided with a packing ring; all as shown and described.

[This invention consists in arranging a beer pitcher with a movable partition which extends from top to bottom and near to the spout, having a strainer near to its bottom to operate in combination with the usual strainer before the spout, so that the beer is drawn from the bottom of the pitcher; said partition being movable, so that it can be taken out and cleaned to prevent souring. The invention also consists in the arrangement of a groove on the edge of the cover to receive some suitable packing, so that the cover closes down perfectly tight.]

28,772.—Frederic Plant, of New York City, for an Improved Machine for Making Needles:

I claim the combination of the feeding and groove-stamping apparatus with the needle-holding tubes, substantially as and for the purposes specified.

I also claim the revolving needle tubes for holding the wire and relieving the same, as described.

I also claim the combination of a series of grinding apparatuses, with their adjustable blocks for pointing the needles, and polishing the same with a series of needle tubes or holders, as specified.

I also claim the apparatus for bending the barbs of the needles, as set forth.

I also claim the combination of a series of needle-holders, feed apparatuses, grinding and bending apparatuses, by which a perfect needle can be formed without manipulation in a single machine.

28,773.—H. Poissonniér, of New York City, for a Composition for Silvering Mirrors:

I claim the employment of tartrate of potassa, mixed with nitrate of silver and liquid ammonia about in the proportion specified, for the purpose set forth.

[The object of this invention is to produce a composition which will not only obviate the danger attended with the use of the usual mercurial composition, but which, at the same time, enables the manufacturer to produce cheaper and more durable mirrors than by the ordinary method of silvering.]

28,774.—William Price, of New York City, for an Improvement in Binding Guides for Sewing Machines:

I claim the arrannement of the guide hook, c, and bar, b, on the bar, D. as described, in combination with the hook guide, a, wide mouth, C, and supplementary guide, f; the whole being constructed and operating substantially as and for the purposes set forth and described.

28,775.—Isaac Randall, 2nd, of Claremont, N. H., for an Improvement in Apparatuses for Drying Fruit:

I claim the fire box, H, and the hot-air chamber, G, in combination with the drying box, as shown in Fig. 1 and above described, and shelves, K K, &c., constructed and arranged substantially as set forth.

28,776.—William Rankin, of Richmond, Va., for an Improvement in Cording Guides for Sewing Machines:

I claim a cording guide composed of a single bent piece of metal, and having upon it a guide, e, a groove, i, and an eye, n, and in close proximity to said eye, a recess, r, and also furnished with oblique nicks or indentations, o, inclining in the direction of the feed of the cloth, and so arranged as to come directly under the presser foot, and between it and the lower feed, substantially as and for the purpose set forth.

28,777.—A. J. Rogers, of Stephentown, N. Y., for an Improvement in Seed Planters:

I claim the arrangement of the axle, H, wheels, D D, roller, G, plow, F, cylinder, A, and hopper, B, arranged and operated as described and for the purposes set forth.

28,778.—M. B. Rupp, of McVeytown, Pa., for an Improvement in Seeding Machines:

I claim the arrangement of the plows, Q', upper guides, a, lower guides, R, adjustable, P, caster wheel, o, and the seeding apparatus; the whole being constructed as described.

28,779.—André Sabatier, of New York City, for an Improved Polish for Furniture:

I claim the polish composed of gum benzoin, alcohol and linseed oil in about the proportions specified.

[This] polish is intended for all kinds of household furniture, cabinet work, picture frames, and all articles of wood, and may be also used for metal ware.]

28,780.—C. H. Sayre, of Utica, N. Y., for an Improvement in Cultivator Teeth:

I claim the shank, A, as constructed, in combination with the loose top plate, D, for the purposes set forth.

28,781.—W. F. Shaw, of Boston, Mass., for an Improved Apparatus for Broiling or Roasting by Gas:

I claim the arrangement of the steak-holder, the broiling chamber and the burner or burners.

Also, the arrangement of the two deflectors with the heating chamber and with respect to the burner or burners and the steak-holder, when arranged as specified.

Also, the combination of the closed air-chamber or space in the cover with the steak-holder and the heating chamber, arranged as specified.

Also, The combination of the vertical side or cover with the steak-holder and drip pan, said side or cover having a closed air-chamber or space as specified and shown in the drawings.

28,782.—Daniel Sheets, S. H. Dubois and J. B. Pressey, of Suisun City, Cal., for an Improvement in Machines for Reaping and Mowing:

We claim the combination of the forward and backward reciprocating cutter with the stationary spear-shaped fingers of cutters constructed, arranged and operating together in the manner and for the purpose set forth.

28,783.—A. B. Smith, of Clinton, Pa., for an Improvement in Raking and Binding Apparatuses for Harvesters:

I claim the mechanism described, or its equivalent, arranged to operate one or more compressing arms, independent of the binding arm, and work said compressing arm down on top and over the gavel, substantially as described.

And in combination with one or more compressing arms arranged to work down over the grain or gavel as described, I claim the mechanism described, or its equivalent, for operating one or more compressing arms working up under the gavel, independent of the binding arm, substantially as described, so as to compress the gavel without the aid of the band or arm carrying the band.

I also claim the mechanism, or its equivalent, for making the compressing arms to work before or in advance of the arm that carries a band, to open a space between the grain or straw on the platform and the gavel for the end of the binding arm to come through, substantially as described.

I claim the application and arrangement of the devices substantially such as are described, which operate the binding arm, N, with a positive motion in each direction, for the purpose specified.

I claim the hook, P, hollowed on its under side, operating in combination with the binding arm, N, carrying the knotted end of the band, as described.

28,784.—J. P. Smith, of Hummelstown, Pa., for an Improvement in Corn-shellers:

I claim the combination of the ogee-shaped shelling wheel, B, with the ear-holder, C, provided with the adjustable teeth, p p—the several parts constructed, arranged and operating substantially in the manner and for the purpose set forth.

28,785.—W. H. Smith, of Birmingham, Conn., for an Improvement in Sewing Machines:

I claim obtaining the lateral portion of such movement by means of a link, W, connecting the needle-carrier, S, with the feed rock-shaft, and acting in combination with a spring, W', as described.

[This invention consists in a novel arrangement of the parts for producing the double looped stitch.]

28,786.—W. H. Smith, of Newport, R. I., for an Improvement in Stoves:

I claim, first, The arrangement of the opening, h, partitions, c c, and compartment, F, in combination with the base, A', compartment, G, trunks, H H', and annular passages, I, as and for the purposes shown and described.

Second, Placing the oxygen supply tubes, Q P P, between the inner and external cylinders, A E, and consequently in contact with the heated products of combustion, for the purpose of admitting warm oxygen to the inflammable gases within the cylinder, A, and thereby insure their perfect combustion.

28,787.—Jacob Stam and John Shubert, of Sardinia, Ohio, for an Improvement in Spoke Machines:

We claim the combination with the pendulum frame, P, of the swivel frame, Q, in which the shaft of the cutter head is mounted—the whole being constructed and made to operate substantially as and for the purposes set forth,

28,788—J. S. Steiner, of St. Louis, Mo., for an Improvement in Sewing Machines:

I claim imparting to the shuttle, K, a receding motion from the needle, the moment after said needle has entered the cloth and before it has arrived at the lowest position, for the purpose of taking up the slack of the shuttle-thread after the latter has been turned over the edge of the cloth, to work a button-hole substantially in the manner and for the purpose described.

I also claim so combining the hook, Q, with a needle and shuttle as that it may be readily coupled or uncoupled from the driving part of a sewing machine, by means substantially such as described, for the purpose of changing the machine from a button-hole to plain work sewing machine, and vice versa, substantially in the manner described.

28,789.—A. S. Sterling, of Buffalo, N. Y., for an Improved Boiler for Cooking Stoves:

I claim the combination and arrangement of the concave bottom, B, extension rim, E, and saucer concave, F, for the purposes and substantially as set forth.

28,790.—Robert Stokes and D. J Jones, of New York City, for an Improvement in Skirt Hoops:

I claim the employment, in combination with the hoops, A B, and slides, D D, in the manner substantially as shown and described, of spreaders, c, for the purpose set forth.

28,791.—Cornelius Teachout, of Waterford, N. Y., for an Improved Drill Rest:

I claim, as an improved article of manufacture, a drill rest provided with a shank, F, movable guide blocks, C C, and adjusting screws, D D—all constructed and arranged together substantially as described, for use in tool-holders of machinists' lathes.

28,792.—I. L. Vansant, of Red Lyon, Del., for an Improvement in Adjustable Carriage Seats:

I claim the combination of the hinged, knuckled and slotted legs with the levers, shoes and ways described and shown by my drawings as (and for the purposes) of self-adjusting carriage seat composed wholly or in part of iron or other suitable metal or wood as before set forth.

28,793.—H. C. Vion, of Paris, France, for an Improved Method of Utilizing Atmospheric Electricity:

I claim, first, The peculiar arrangement of means specified, whereby I am enabled to use the positive electricity contained in the atmosphere and the negative electricity contained in the earth, and thus form an electric pile of considerable power and make the electricity therein contained available for industrial purposes, as set forth.

Second, The combination of an aerostat and vertical wire-work, with a tube, I, for admitting gas into the aerostat in the manner and for the purposes set forth.

28,794.—H. N. Wadsworth, of Washington, D. C., for an Improved Tooth Brush:

I claim the construction of a brush with a wedge-shaped end, in combination with the obliquely-set bristles—the whole arranged and operating as specified and for the purposes set forth.

28,795.—C. C. Walworth, of Boston, Mass., for an Improved Steam Trap:

I claim the combination of the high pressure steam chamber, f, reduced steam chamber, c, valve, g, and diaphragm, a, or its equivalent, so arranged that the communication between these chambers is controlled by the direct action of high pressure steam upon one side of the valve, to open it, and of reduced steam upon the diaphragm and the other side of the valve, to close it.

Also, in combination with a reduced steam chamber, a siphon, m' m, substantially as and for the purpose specified.

28,796.—H. M. Walker, of Watertown, Conn., for an Improvement in Connecting Shafts to Two-wheeled Vehicles:

I claim the manner essentially described of attaching the shafts to two-wheeled vehicles, whereby said shafts may be operated in the manner and for the purposes set forth.

28,797.—A. F. Warren, of Brooklyn, N. Y., for a Penholder:

I claim having the noses, a, which form the socket for the pen, turned up or otherwise arranged, substantially as described, so that if the pen is inserted, the stick or pencil is allowed to pass clear through the tube.

28,798.—E. T. Wheeler, of Cannelton, Ind., for an Improved Shingle Machine:

I claim the combination with a reciprocating carriage, B, and saw-C', of the adjustable head blocks, E E E E, their clamps, h h, arranged and operating automatically, substantially as set forth, and the adjustable tables, J J—all arranged in the manner and for the purposes described.

I also claim, in combination with the tables, J J, and carriage, B, when the machine is used for sawing shingles, of the pawl, m, vibrating rod, N, connecting rods, n n, bars, J' J', with their adjustable blocks, K K, arranged and operating in the manner described and represented.

28,799.—Louis Wilhelm, of Buffalo, N. Y., for an Improvement in the Ventilation of Casks containing Liquids:

I claim the combination of the plug, b b, valve, f, rod, d, spring, e, cord, I, and faucet, H L—the said parts being constructed and arranged and operating in the manner and for the purposes set forth.

28,800.—W. P. Wood, of Washington, D. C., for an Improved Scroll-sawing Machine:

I claim, first, The horizontal pitman, K, and sectional wheel, H, or their or either of their equivalents, as arranged in combination with the hinged connecting strips, I and I', connecting arms, J, and straining block, c, or their or either of their equivalents; the whole being constructed, arranged and operated in the manner and for the purposes substantially as set forth.

Second, Combining the guide-way, E, and buffer in one piece, so that they can be simultaneously adjusted to suit saw blades of different lengths, substantially as described.

Third, The adjustable slotted plates, p, in combination with buffer foot, n, having in its fork a plain friction roller, in the manner and for the purposes substantially as set forth.

28,801.—L. B Woolfolk, of Nashville, Tenn., for an Improvement in Steam Plows:

I claim, first, The arrangement of the shaft, C, the loose pinions, G G, and the clutches, H H, with the driving wheels, E E—the whole being constructed and arranged substantially as herein described.

Second, The arrangement of the wheel, T, having its axis out of the line of attachment to the frame, S, in the journal at U, so as to answer and adjust itself to the movements of the driving wheels, substantially as set forth.

Third, The employment of the wheel, T, having its shank, z, turning loosely in the journal box at W, and provided with an oblong, d, confined between the springs, a a, in combination with the lever, x, the rack bar, w, and the segments, y y, substantially as set forth.

Fourth, The arrangement of the friction wheels, m m, the shafts, s s t t, with the driving wheels, E E, and shaft, C, substantially as represented.

28,802.—Clark Wright and William Phelps, of Sycamore, Ill., for an Improved Churn:

We claim the combination of the rotary tub, F, stationary spout, K, and basket, H, operating substantially as and for the purposes set forth.

28,803.—Thomas Yates, of Dubuque, Iowa, for an Improvement in Coffee Pots:

I claim the arrangement and combination of the inverted bell-shaped chamber, H, perforated cylinder, F, strainer, G, and vessel, A, constructed and operating substantially in the manner and for the purpose set forth.

[This invention consists in the arrangement of an inverted bell-shaped chamber and a perforated chamber, both covered by a strainer, in combination with a water vessel of ordinary construction, in such a manner that the essence of the coffee or other substance to be boiled is retained under the bell-shaped chamber, and, on cooling, said essence is absorbed by the water rushing in and filling the chamber.]

28,804.—E. S. Yentzer, of Middletown, Pa., for an Improvement in Sewing Machines:

I claim the combination and arrangement of the horizontally-reciprocating shuttle, X, vertically-reciprocating needle, N, feed pad, I, disk, R (having cam grooves, S U, of the peculiar configuration described in its opposite faces), eccentric, O, lever, E, lever, T T', and lever, L; the whole constructed and operating in the manner described, for the purpose of making the peculiar stitch represented in Figs. 7 and 8 of the drawings.

Second, A shuttle (for sewing machines) constructed with a sliding block, a b, spiral spring, c, and set screws, z; the said parts being so arranged that a positive friction on the bobbin, Y, is produced by the screw, and the action of the spring, when the screw is slackened, is to throw out of contact with the bobbin, substantially as and for the purposes set forth.

28,805.—Lyman Bridges (assignor to himself and N. M. Simonds), of Chicago, Ill., for an Improved Heating Apparatus:

I claim the combination of the oil reservoir, J, with the oil chamber, H, and cylinders, A D, as and for the purpose shown and described.

I also claim the combination of the inclined or conical plate, F G, arranged as shown, with the cylinders, A D, in the manner and for the purpose shown and described.

I also claim the arrangement and combination, in the manner shown and described, of the cylinder, M, and plates, B N, with the cylinders, A D, so that both surfaces of the combustion chamber will be protected by ascending columns of air, which will also become heated, all as specified.

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28,806.—Albert Broughton (assignor to himself and Alexander Lindsay), of Malone, N. Y., for an Improvement in Stump Extractors:

I claim, first, The mode of conve ing the hoisting gin into a cart or vehicle for the transportation of the machine and its apparatus, as shown in Fig. 6.

Second, The arrangement, connecting together, and combination of the hoisting gin and main lever, in the manner shown in Figs. 1 and 2, for the purposes stated.

Third, The method of attaching the main lever to the roots of the tree or stump, as shown in Figs. 1 and 2, and above described, together with the use of the main lever, as arranged, for the purpose stated.

Fourth, The arrangement, connecting together, and the combination of all the several parts of the machine, substantially in the manner shown in the annexed drawings and above described, for the purposes and uses in this specification above stated and set forth.

28,807.—P. W. Gates and D. R. Frazer (assignors to themselves and Thomas Chalmers), of Chicago, Ill., for an Improvement in Machines for Stamping Metal Quartz:

We claim, first, The combination of a toothed and collared rising and falling power bar, D D, or its equivalent, with a combined plain and toothed lifting device, H I, substantially as and for the purposes set forth.

Second, The manner, substantially as specified, of arranging the lifting device on its shaft, for the purposes set forth.

Third, The combination of two eccentric gears, M, toothed and collared power bar, D G, and the combined lifting device, H I, substantially as and for the purposes set forth.

Fourth, The combination with the inclined screens, P P, of the mortars of the overhanging shields or guards, N' N', substantially as and for the purposes set forth.

28,808.—John Green (assignor to Nathan Thompson, Jr.), of Brooklyn, N. Y., for an Improved Machine for Planing Warped Surfaces:

I claim the combination of concave and convex rotating cutters, or either of them, mounted on a frame free to turn on an axis, with a stationary table or support for the plank to be reduced; the turning frame being provided with proper contrivances for rotating and holding it, and the combination constructed so as to produce warped surfaces, substantially in the manner described.

28,809.—Stephen Jackson, of Ossippee, N. H., assignor to D. L. Hodsdon, of Somersworth, N. H., for an Improved Blind Slat Machine:

I claim, in combination with the awls and cutters, or mechanism for piercing the edges of a blind slat, and forming it with tenons on its ends, as specified, the slat hopper or rests, X X, and platform, V, and the impeller, O, or mechanism for successively removing the slats therefrom and feeding them forwards between and away from the journal cutters.

I claim the self-acting or spring cam stops, Z Z, in combination with the impeller, O, the platform, V, and the inclined rails, U U, the said cam stops being arranged and applied substantially in manner and to operate as specified.

I also claim the combination of inclined rails, U U, with the platform, V, and the awls or awl carrier; the object of such inclined rails being to cause an inclination out of the path of the awls of a slat while being expelled from the machine.

I also claim the combination of the end guides and slat-holders, T T, with the tenon-cutting mechanism, the platform and spring pressers or slat-supporting devices, as specified.

I also claim the combination of the rests, p p, with the impeller, O, in manner and for the purpose substantially as specified.

28,810.—E. A. Kimball (assignor to himself and A. L. Miller), of Boston, Mass., for an Improved Alarm Gage for Steam Boilers:

I claim the arrangement and application of a slide valve, alarm whistle, valve seat, float lever and index pointer, in such manner that, by the movements of the slide valve, occasioned by the float lever, the indicator or index pointer shall be moved along its index or arc of divisions; and whenever the water of the boiler may have reached its lowest safety level, the valve port of the steam whistle or the alarm apparatus shall be opened so as to enable the steam to pass into the whistle and sound an alarm.

I also claim providing the float stem with a steam passage extending longitudinally through it and opening into the boiler and dry steam chamber, as and for the purpose specified.

I also claim so applying to the index chamber the device for moving the indicator that any steam which may escape from the valve opening of such device may not enter the index chamber, so as to foul or condense on its glass.

28,811.—John Low, of Clinton, Mass., assignor to Nathan Bruce, of Southboro, Mass., for an Improvement in Dulcimers:

I claim the arrangement, as described, of the central bridge, 6, in relation to and in combination with the bridges, 4 and 5, in the manner described, by which one part of each string is made to give a single chromatic interval of pitch higher than the other part, substantially as and for the purposes set forth.

28,812.—G. W. Oliver (assignor to Henry Parker and C. W. Yale), of New York City, for an Improvement in Preserving Meats:

I claim the application or employment of heat to the specific purpose of curing and preserving meats, as corned provisions, in such a way and to such an extent as will effectually or sufficiently coagulate the albumen of the tissues and fluids, in combination with the subsequent application of heated brine or preservative fluid.

28,813.—A. D. Rollins, of Green Point, N. Y., assignor to himself and H. J. Howland, of New York City, for an Improved Steering Apparatus:

I claim, first, The shaft and wheels, G M N, reverse segments, m n, guard, R, rider, T, and open jaws, E E', arranged to operate together substantially as and for the purpose set forth.

Second, In steering gear substantially as above described, the geared shafts, G and H, and socket, f, adapted to receive either G or H at pleasure, substantially as and for the purpose set forth.

Third, In steering gear substantially as above described, the stop, K, arranged to operate in the gear wheel, g, substantially as described.

28,814.—I. M. Rose, of New York City, assignor to J. R. Morrell, of Brooklyn, N. Y., for an Improvement in Sewing Machines:

I claim the revolving hook, l, carrying the bobbin, 3, and lower needle, o, in combination with the perforating eye-pointed needle, i, substantially as specified, whereby the threads are concatenated, as set forth.

28,815.—Rhoda Sowle, of Fall River, Mass., administratrix of the estate of David Sowle, deceased, late of Fall River, for an Improvement in Lozenge Machines:

I claim, first, The arrangement of a plain smooth roller, F, to operate in combination with the plunger, E, and cutters, c, substantially in the manner and for the purpose described.

Second, I claim combining with each row of cutters, C, on the rotary cylinder, B, a separate clearer, K, constructed and operating substantially in the manner and for the purpose described.

Third, The arrangement of the two endless aprons, H and M, one at right angles to the other, to operate in combination with the cylinder of cutters, B, and with the drum, D, and with the clearers, K, or their equivalents, substantially as and for the purpose set forth.

[With this machine a very large quantity of lozenges can be cut out, marked with the desired inscriptions or characters and deposited on an endless apron, from which they are removed to the drying oven; at the same time, the paste which may adhere to the outside of the cutters is cleaned off, and the scraps are deposited on an endless apron and carried off over the side of the machine.]

28,816.—J. H. Steiner, of Philadelphia, Pa., assignor to himself and J. E. Thomson, of Buffalo, N. Y., for an Improvement in Railroad Car Wheels:

I claim constructing the cast iron part of the wheel with chambers or tapering pockets, in combination with wedge-like blocks of wood, B, having shoulders, b', and the wrought iron band, c, shrunk thereon, for the purposes and substantially as described.

28,817.—J. H. Steiner, of Philadelphia, Pa., assignor to himself and J. E. Thomson, of Buffalo, N. Y., for an Improvement in Railroad Brakes:

I claim, first, The spring, C, in combination with the shoe, A, and cam, D, substantially as set forth.

Second, The combination and arrangement of the hook, N N', and flange, N2, with the cam, D2, cam shaft, E, spring, C, and shoe, A, for the purposes and substantially as described.

28,818.—George Stover (assignor to himself and the Stanley Rule and Level Company), of New Britain, Conn., for an Improved Machine for Finishing Works in Wood and Metal:

I claim the combination of the sliding plates, j, the milled or cutting plates, n, guide ways, m, with a proper holding jack, r, upon the bed, p, constructed and operating substantially in the manner as and for the purpose described.

28,819.—D. H. Thorp, of Chelsea, Mass., assignor to the Boston Faucet Company, of Boston, Mass., for an Improvement in Faucets:

I claim, in the basin faucet having a conical tubular elastic packing, C, made and applied to its valve, the stem and case thereof, as described, the arrangement of the stop, x, and its shoulder, y, or chamber by which such shoulder is formed in the part, D, with operating screws, i k f m, and tubular elastic packing, C, applied to the valve stem, e, and its valve, B, substantially as specified.

28,820.—William Wright (assignor to himself and John Brady), of Philadelphia, Pa., for an Improved Animal Trap:

I claim, first, The general arrangement of base, A, the upright, B, spiked board, C, spring, G, lever, D, and trigger plate, F.

Second, I claim the projection, m, on the spiked board, C, when the notches of the said projection are arranged in respect to the spring, as and for the purpose set forth.

RE-ISSUES.

W. N. Whitely, Jr., of Springfield, Ohio, assignee of T. S. Steadman, of Murray, N. Y., for an Improvement in Clover and Grass Seed Harvesters. Patented May 23, 1854:

I claim the main frame or box, A, which carries the pinion which drives the cutters, in combination with the arm or supplementary frame, J, provided with axle, t, and the main wheel and gearing, substantially as described, for the purposes specified.

I also claim the arm or supplementary frame, in combination with the master wheel and gearing, when said arm or supplementary frame is so connected with the main frame as to vibrate from and around the pinion shaft, substantially as shown and described for the purpose set forth.

W. N. Whitely, Jr., of Springfield, Ohio, assignee of T. S. Steadman, of Murray, N. Y., for an Improvement in Clover and Grass Seed Harvesters. Patented May 23, 1854:

I claim, in combination with the main frame or box, A, and arm or supplementary frame, F, on which is formed or secured the master wheel axle, the employment of a retaining arc, H, or its equivalent, the whole constructed and arranged in such a manner that the main frame or box, and arm or supplementary frame, with its master wheel axle, will be held in parallel planes relatively to each other while they are moving up and down, substantially as and for the purposes set forth.

W. N. Whitely, Jr., of Springfield, Ohio, assignee of T. S. Steadman, of Murray, N. Y., for an Improvement in Clover and Grass Seed Harvesters. Patented May 23, 1854:

I claim constructing the machine in such a manner that the attendant can, while riding on the machine, raise and lower in the arc of a circle, and hold at different hights, either end of the cutting apparatus, as described, for the purpose specified.

J. T. Trotter, of New York City, for an Improvement in Vulcanizing India-rubber. Patented Dec. 3, 1850:

I claim the process or method of curing india-rubber, gutta-percha, or other vulcanizable gums or compounds thereof, by means of a hyposulphite of zinc, or other artificial preparation of zinc and sulphur having like chemical constitution, properties and qualities, as described, for vulcanizing india-rubber and other vulcanizable gums or compounds thereof, without the use of raw or free sulphur for the purposes of curing the rubber.

ADDITIONAL IMPROVEMENT.

T. S. Whitman, of New York City, for an Improvement in Attaching Skates to Boots. Patented Dec. 20, 1859:

I claim the male and female vertical dovetail portions, substantially as described and represented, whereby the heel portion of the skate iron will be secured against lateral or longitudinal movement independent of the front attachment.

DESIGNS.

Birdsill Holly, of Lockport, N. Y., for a Design for a Pump.

Louis Meyer, of St. Louis, Mo., for a Design for a Parlor Stove.

William Pountney, of New York City, for a Design for Decanter Stoppers.

R. H. N. Bates, of Providence, R. I., assignor to J. Morrison, Jr., of Troy, N. Yr, for a Design for the Plates of a Cooking Stove.

Lemuel Morgan, of South Norwalk, Conn., assignor to himself and C. Adams, of New York City, for a Design for a Fire Shovel (4 cases).

H. G. Thompson, of New York City, assignor to the Hartford Carpet Company, for a Design for a Carpet Pattern (11 cases).

NOTE.—In the above list of claims, issued for the week ending June 19, we recognize THIRTY-SEVEN of the number which were solicited through this office.—EDS.

Notes & Queries.

CORRESPONDENTS sending communications for publication in our columns are requested to avoid writing on both sides of a sheet of paper. This fault, though common to persons unaccustomed to writing for the press, gives great trouble to the printer (especially in long articles), and, when combined with illegibility of handwriting, often causes interesting contributions to be regretfully consigned to our waste-paper basket.

H. M., of N. J.—Your improvement in reapers is new to us, and we should think a patent might be obtained for it. If you desire your claims to be prosecuted vigorously, send us a model and the patent fee, $30.

F. G. D., of C. W.—Your idea of using lime in a slacking state as a fuel for cooking in summer is not new. In 1856, W. W. Albro, of Binghampton, N. Y., secured a patent through this office for a portable cooking stove in which the caloric is generated by the employment of water in small jets upon lime. On page 280 Vol. XI. (old series) of the SCIENTIFIC AMERICAN, an engraving of this ingenious apparatus may be found. Last summer, Mons. Blondin, the fool-hardy acrobat, used, if we recollect aright, a lime stove to cook a beefsteak while on his rope midway between the banks over the Niagara river, several hundred feet above the rushing waters.

J. W. P., of Mass.—Boiled linseed oil containing about an ounce of the oxyd of manganese, or litharge, to the quart, will make an excellent waterproof coating for cotton or linen cloth. Put on several coats with a brush, and allow each to dry perfectly.

L. & C., of Texas.—The account of the operations of the water-wheels at Philadelphia, as published in our columns, although correct, may be different in some particulars from that of the Chief Engineer, whose report is not yet published. We will therefore retain your letter until we obtain a copy of the report. We thank you for the statistics contained in your communication.

R. W. E., of Miss.—Your system of aerial navigation is novel at least, but you will find it difficult to get a lens to suit your purpose for heating the air.

A. W. H., of Conn.—A good alloy for small patterns is a composition of 77 parts copper and 23 parts of tin.

C. H., of Va.—Boil the cotton cloth for your awnings for one hour in a liquor into which has been dissolved one ounce of alum and the same amount of blue vitriol to every four gallons of water. Allow the cloth to dry thoroughly before it is put up. If the awning is up, brush its surface over with a hot liquor of alum and blue vitriol. This will tend to prevent mildew, and render it more durable.

S. I. B., of Ga.—Tin is the best substance to use with mercury as an amalgam for silvering glass, so far as we know.

J. W. R., of Mass.—Boil white tallow in a very strong caustic soda lye until it becomes saponaceous, then cool it, and you will have hard soap. Caustic lye is made by boiling equal quantities of slacked lime and soda ash for about fifteen minutes in water, and allowing the sediment to fall down. The clear liquor only is employed in soap-making.

C. C. D., of Mass.—Every coil in a water pipe increases the friction, and should, if possible, be avoided. A shortpipe for a water ram is certainly better than a long one, because the resistance increases with the length.

C. H. R., of N. Y.—A dry needle will float on water, if laid carefully upon it, owing to the repulsion or what scientists call "the sphere of repulsion" between the surface of the steel and the fluid.

A. B. C., of Ill.—Please to send us your proper address, and we will forward you our circular of advice about foreign patents.

C. R., of N. J.—Cows' horns may be softened by boiling them in water, and they may be pressed into almost any shape when hot, by placing them in suitable dies.

J. B., of N. B.—There is no uniform system of pitch used for the propellers of steamers. The best propellers, such as Griffin's (English) is adjusted for a varied pitch. We believe that a windmill 10 feet in diameter, and with fans five feet wide, and a pitch of two feet would drive your threshing machine without difficulty in a moderate breeze.

G. S. P., of Wis.—Strong glue cannot be used cold, because it congeals at a moderate temperature. If you wish to use strong sticky glue, you must put it on hot.

W. B., of Md.—We gave the substance of Mr. Murray's lecture as we found it in foreign periodicals. We shall have something more to say about superheated steam in a week or two.

A. B., of N. B.—The same difference in pressure, as indicated by valve and gage, has often puzzled engineers, and will be found even if the gage used is the common mercurial siphon which cannot be incorrect. The apparent difference arises from the mode of measuring the valve in common practice; that is to say, taking the area of the bottom or smaller end of the seat, which seems theoretically to be the correct way. Repeated and carefully conducted exporiments show that the valve measured in this way will never agree with the gage; but if you take the area of the valve at the middle of the seat, you will find them always agree. We suppose that in grinding the valve the bearing is brought to or above the middle of the seat, and that the lower half of the valve base is never perfectly tight, though it may appear to be so.

A. M., of Mass.—You state that friction increases with the increase of surface independent of the weight of the rubbing surface, because of the pressure of the atmosphere. We cannot see how atmospheric pressure has anything to do with the question. Upon your principle of reasoning, a man of 150 pounds weight with a foot of 46 square inches area will exert greater pressure upon the ground when he walks than a man of 200 pounds weight with a foot of 38 square inches area. The pressure of the former will be 840 pounds, that of the heavy man 770 pounds. We take the atmospheric pressure to be equal on all sides of the journals.

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L. C. T., of N. C.—If you will read the article on boiler explosions (Vol. II., page 345) carefully, you will see that we did not make the comparison between a boiler explosion and the popping of the cork from a soda water bottle. Your theory of explosions is that the water is decomposed by red-hot plates, then atmospheric air gets in, and mixes with the hydrogen in the boiler which ignites, and the gases then go off like gunpowder. This theory has been frequently advanced, and would be very plausible only that it wants facts to sustain it, because air cannot get into a boiler in sufficient quantity to burst a pop-gun.

J. T. B., of Wis.—There is not a good work on millwrighting, according to present practice, in print.

W. R. L., of N. Y.—A long screw-driver, with as narrow an edge, and having a handle no thicker than a short driver, will not drive a screw any better, according to our view of the question. Long screw-drivers have thicker handles and longer edges, generally, which give them greater leverage.

E. A., of Conn.—To make black walnut resemble rosewood, in a measure, use a strong decoction of Brazil wood in lac-varnish, to make the red colored veins. To make perfectly black streaks, use a strong decoction of logwood, in which a few grains of copperas has been dissolved.

MONEY RECEIVED

At the Scientific American Office on account of Patent Office business, for the week ending Saturday, June 23, 1860:—

F. W., of N. Y., $30; R. H., of Conn., $30; D. A. D., of Fla., $25; B. F. G., of Mass., $30. B. & B., of Iowa, $30; O. P. A., of Mass., $30; T. B., of Va., $30; B. & F., of Wis., $25; G. H. M., of N. Y., $30; W. M., of Minn., $30; A. R. P., of Texas, $35; T. W. McD., of Ill., $30; J. H., of Ind., $30; D. & H. W., of Pa., $25; S. B., of Ohio, $30; A. & C., of Mo., $30; D. B., of Mo., $35; L. L. A., of Mo., $30; C. J. S., of N. Y., $25; McC. & J., of N. J., $35; H. C. F., of Va., $25; C. & B., of C. W., $25; A. W., of N. Y., $30; D. F., of Mich., $30; J. G., of Ky., $200; E. E., of Ill., $30; E. L. P., of Conn., $25: L. D. L., of Ill., $25; H. & N., of N. J., $30; J. G., of N. Y., $25; J. H. H., of Pa., $25; J. K., of Ohio, $30; H. W. N., of Ala., $25; H. K., of N. Y., $30; W. G. M., of Va., $30; L. D. B., of Mo., $25; J. T., of L. I., $55; W. W. S., of Iowa, $30; W. C., of Ill., $30; D. T. S. W., of Md., $25; G. B. P., of N. Y., $100; J. H. B., of Ill., $30; J. R., of Pa., $30; W. M. G., of Ohio, $30; J. H., of N. J., $30; H. M., of Iowa, $25; E. A. P., of Mass., $30; S. F. Van C., of Cal., $20; J. S., of N. Y., $60; J. B. L., of N. J., $25; M. A. B., of Fla., $30; L. S. G., of N. Y., $30; D. W. W., of Ohio, $30; P. & B., of Pa., $35; W. B. A., of Ill., $27; E. D. A., of Ala., $30; E. W., of N. J., $20; M. A. W., of Cal., $50; A. St. D., of La., $30; H. Y. W., of Pa., $30; J. S., of Ga., $25 J. W., of N. Y., $30; T. W., of N. Y., $20; G. W. Van D., of N. Y., $30; W. H. G., of N. Y., $35; I. C. T., of Pa., $30; J. R. L., of Mass., $25; B. & N., of Vt., $35; D. R., of N. Y., $30; G. H., of Mass., $30; J. R. C., of Ind., $12.

Specifications, drawings and models belonging to parties with the following initials have been forwarded to the Patent Office during the week ending Saturday, June 23, 1860:—

J. T., of N. Y.; McC. & J., of N. J.; J. M., of N. Y.; C. J. S., of N. Y.; G. W. L., of N. Y.; J. K., of Ohio; J. H. H., of Pa.; E. R., of N. H.; D. F., of Miss.; H. F., of Ind.; D. A. D., of Fla.; D. F. S. W., of Md.; T. S., of Pa.; S. E. T., of N. J.; H. W. N., of Ala.; A. A., of N. Y.; H. C. F., of Va.; E. L. P., of Conn.; H. A. R., of Ohio (two cases); Z. D., of Ga.; P. & F., of N. Y.; T. O. S., of Cal.; J. B. L., of N. J.; D. & H. W., of Pa.; H. M., of Iowa; B. & F., of Wis.; L. D. L., of Ill.; P. & B., of Pa.; L. D. B., of Mo.; S. P., of Canada; G. W. Van D., of N. Y.; J. R. C., of Ind.; W. H. G., of N. Y.; G. W. R., of N. Y. (2 cases); J. S., of S. C.; J. R. L., of Mass.

USEFUL HINTS TO OUR READERS.

BOUND VOLUMES.—Persons desiring the first volume of the New Series of the SCIENTIFIC AMERICAN can be supplied at the office of publication, and by all the periodical dealers; price, $1.50; by mail, $2, which includes postage. The volume, in sheets, complete, can be furnished by mail; price $1. Vol. II. is now bound and ready for delivery. The price for this volume is the same as that charged for Vol. I.

BINDING.—We are prepared to bind volumes, in hand some covers, with illuminated sides, and to furnish covers for other binders. Price for binding, 50 cents. Price for covers by mail, 50 cents; by express, or delivered at the office, 40 cents.

INVARIABLE RULE.—It is an established rule of this office to stop sending the paper when the time for which it was prepaid has expired; and the publishers will not deviate from that standing rule in any instance.

PATENT CLAIMS.—Persons desiring the claim of any invention which has been patented within 14 years, can obtain a copy by addressing a note to this office, stating the name of the patentee, and date of patent when known, and enclosing $1 as fee for copying.

INVENTORS SENDING MODELS to our address should always enclose the express receipt, showing that the transit expenses have been prepaid. By observing this rule we are able, in a great majority of cases, to prevent the collection of double charges. Express companies either, through carelessness or design, often neglect to mark their paid packages, and thus, without the receipt to confront them, they mulct their customers at each end of the route. Look out for them!

SUBSCRIBERS TO THE SCIENTIFIC AMERICAN who fail to get their papers regularly will oblige the publishers by stating their complaints in writing. Those who may have missed certain numbers can have them supplied by addressing a note to the office of publication.

GIVE INTELLIGIBLE DIRECTIONS.—We often receive letters with money inclosed, requesting the paper sent for the amount of the enclosure, but no name of State given, and often with the name of the Post-office also omitted. Persons should be careful to write their names plainly when they address publishers, and to name the Post-office at which they wish to receive their paper, and the State in which the Post-office is located.

RATES OF ADVERTISING.

THIRTY CENTS per line for each and every insertion, payable in advance. To enable all to understand how to calculate the amount they must send when they wish advertisements published, we will explain that ten words average one line. Engravings will not be admitted into our advertising columns; and, as heretofore, the publishers reserve to themselves the right to reject any advertisement sent for publication.

IMPORTANT TO INVENTORS.

THE GREAT AMERICAN AND FOREIGN PATENT AGENCY.—Messrs. MUNN & CO., Proprietors of the SCIENTIFIC AMERICAN, are happy to announce the engagement of HON. CHARLES MASON, formerly Commissioner of Patents, as associate counsel with them in the prosecution of their extensive patent business. This connection renders their facilities still more ample than they have ever previously been for procuring Letters Patent, and attending to the various other departments of business pertaining to patents, such as Extensions, Appeals before the United States Court, Interferences, Opinions relative to Infringements, &c., &c. The long experience Messrs. MUNN & Co. have had in preparing Specifications and Drawings, extending over a period of fifteen years, has rendered them perfectly conversant with the mode of doing business at the United States Patent Office, and with the greater part of the inventions which have been patented. Information concerning the patentability of inventions is freely given, without charge, on sending a model or drawing and description to this office.

Consultation may be had with the firm, between NINE and FOUR o'clock, daily, at their PRINCIPAL OFFICE, No. 37 PARK ROW, NEW YORK. We have also established a BRANCH OFFICE in the CITY OF WASHINGTON, on the CORNER OF F AND SEVENTH-STREETS, opposite the United States Patent Office. This office is under the general superintendence of one of the firm, and is in daily communication with the Principal Office in New York, and personal attention will be given at the Patent Office to all such cases as may require it. Inventors and others who may visit Washington, having business at the Patent Office, are cordially invited to call at their office.

They are very extensively engaged in the preparation and securing of Patents in the various European countries. For the transaction of this business they have Offices at Nos. 66 Chancery Lane, London; 29 Boulevard St. Martin, Paris, and 26 Rue des Eperonniers, Brussels. We think we may safely say that three-fourths of all the European Patents secured to American citizens are procured through our Agency.

Inventors will do well to bear in mind that the English law does not limit the issue of patents to inventors. Any one can take out a patent there.

A pamphlet of information concerning the proper course to be pursued in obtaining patents through their Agency, the requirements of the Patent Office, &c., may be had gratis upon application at the Principal Office or either of the Branches. They also furnish a Circular of Information about Foreign Patents.

The annexed letters, from the last three Commissioners of Patents, we commend to the perusal of all persons interested in obtaining Patents:—

Messrs. MUNN & Co.:—I take pleasure in stating that while I held the office of Commissioner of Patents, MORE THAN ONE-FOURTH OF ALL THE BUSINESS OF THE OFFICE CAME THROUGH YOUR HANDS. I have no doubt that the public confidence thus indicated has been fully deserved as I have always observed, in all your intercourse with the Office, a marked degree of promptness, skill and fidelity to the interests of your employers. Yours, very truly,

CHAS. MASON.

Immediately after the appointment of Mr. Holt to the office of Postmaster-General of the United States, he addressed to us the subjoined very gratifying testimonial:—

Messrs. MUNN & Co.:—It affords me much pleasure to bear testimony to the able and efficient manner in which you have discharged your duties of Solicitors of Patents while I had the honor of holding the office of Commissioner. Your business was very large, and you sustained (and, I doubt not, justly deserved) the reputation of energy, marked ability and uncompromising fidelity in performing your professional engagements. Very respectfully,

Your obedient servant, J. HOLT.

Messrs. MUNN & Co.:—Gentlemen: It gives me much pleasure to say that, during the time of my holding the office of Commissioner of Patents, a very large proportion of the business of inventors before the Patent Office was transacted through your agency, and that I have ever found you faithful and devoted to the interests of your clients, as well as eminently qualified to perform the duties of Patent Attorneys with skill and accuracy. Very respectfully,

Your obedient servant, WM. D. BISHOP.

Communications and remittances should be addressed to

MUNN & CO.

Publishers, No. 37 Park-rew, New York.

NOTICE.—TO MANUFACTURERS OF WOOD LATHES.—Wanted, lathes for turning handles for axes, picks, hatchets, &c. Address, with full particulars, E. & S., Box 316, Trenton, N. J. 1 2*

ATWATER'S DOLLAR COPYING PRESS, WITH manuscript portfolio (containing copying book, with pen, ink, paper, &c.), is the only press completely adapted for use in offices, at home and abroad. Sold by stationers and agents. Sent free to address for $1.27. J. H. ATWATER, Manufacturer.
1* Providence, R. I.

IMPORTANT TO MECHANICS.—THE VARIETY MOLDING MACHINE.—This machine is a combination of six patents, and superior to all others for shaping, planing and molding irregular forms; also straight molding and planing. It is simple and safe to the operator. See illustration on page 329, Vol. I., of the SCIENTIFIC AMERICAN. Send for circular. Address S. M. HAMILTON, Baltimore, Md. 1 13*

SWISS DRAWING INSTRUMENTS—OF EXTRA fine finish, in single pieces or made up in sets to suit the customer. Illustrative sheets of the instruments in full size, sent by mail free. JAMES W. QUEEN & CO., No. 924 Chestnut-street, Philadelphia, Pa. 1 3*

RIGHTER'S IMPROVED PORTER BOX.—PATented June 5, 1860. State rights for sale. Address GEORGE W. RIGHTER, No. 723 North Twenty-second-street, Philadelphia, Pa. 1 2*

BURNHAM'S IMPROVED JOUVAL TURBINE water wheel (patented Feb. 22, 1859) and mill gearing of the latest improved patterns. Manufactured by N. F. BURNHAM, Variety Iron-works, York, Pa. 1 13*

$50.—SEVERAL STATE RIGHTS FOR A valuable (premium) patent for sale cheap. Address Box 871, Brooklyn, N. Y. 1*

SEWING MACHINES.—NEEDLES OF A SUPErior quality on hand, and made to order by JOSEPH THORNE, Manufacturer, No. 6 Howard-street. 1 2*

THE MASSACHUSETTS CHARITABLE MEchanic Association respectfully announce to the public their ninth exhibition of American manufactures and mechanic arts, to be opened at Faneuil and Quincy Halls, on Wednesday, the 12th of September, in the city of Boston. Communication from those who wish more particular information, and from those who will require much space, may be addressed to the subscriber.
1 6* JOSEPH L. BATES, Secretary.

A DRAUGHTSMAN AND ENGINEER acquainted with locomotive, stationary and mill engineering wants a situation. Address "Draughtsman," care of T. D. Stetson, Consulting Engineer, No. 5 Tryon-row, New York. 1*

FULLER IRON RAILING PATENT FOR SALE. Shop rights, with a full set of patterns—24 in number—of this celebrated railing, can be purchased for the sum of $100, cash. See page 376, Vol. I., of the SCIENTIFIC AMERICAN, for illustration of the same. Address M. A. MYERS, No. 426 Broadway, New York. 1*

WANTED—A SECOND-HANDED PHOTOgraphic apparatus. Address J. H., Box 145, Elizabeth, N. J., stating size, price, &c. 1*

H. DAWSON & SON, MANUFACTURERS OF all kinds of spring knitting needles, Cohoes, N. Y.—Having lately increased our facilities for manufacturing, we shall be able to fill all orders with promptness, from the very best wire, made expressly for spring needles. Address H. DAWSON & SON, Cohoes, N. Y. 1 4*

WANTED—A SITUATION, BY A MAN OF industrious and steady habits, who is capable of taking charge of a machine-shop, or of superintending the erection of mills and machinery for the same. Address MACHINIST, Harrison-square, Mass. References exchanged. 1 2*

TO MANUFACTURERS.—CONANT'S PATENT let-off motion for looms or warp regulator is applicable to old and new looms, from the lightest to the heaviest fabric, perfectly reliable, and the only device known by which a uniform tension of the warp, irrespective of the diameter of beam, can be secured. Satisfaction guaranteed. Send for a circular to H. CONANT & CO., Willimantic, Conn. 1 5*

WOODWORTH'S PLANING MACHINES—OF every kind and description, from 8 inches to 26 inches wide, planing from ⅛ inch to 6 inches in thickness; adjusted for thickness by moving all the upper rollers and cylinder up and down together. Some are made to plane both sides at the same time, and tongue and groove, and for surfacing alone, varying in prices from $250 to $2,500. Every machine warranted perfect, or the money returned; these machines cannot be equaled for the same money by any other manufacturer. Address The Lester Manufacturing Company, Richmond, Va.; or J. H. LESTER, No. 57 Pearl-street, Brooklyn, N. Y. 1 6eow

MACKENZIE'S IMPROVED BAKER'S OVEN.—Patented May 1, 1860. Working model and drawings of this valuable oven can be seen at the "Inventor's depot," No. 30 Broadway, New York. Particulars regarding this invention can be had on application to the subscribers, who are sole agents for the sale of State rights. [1] BUTLER, HOSFORD & CO.

INVENTORS' DEPOT AND SALES-ROOMS FOR Patent Rights, No. 30 Broadway, New York.—Patents possessing positive merits—and such only—have, in this depot, their headquarters, where they can be properly introduced to public notice and find purchasers. Constant opportunities for judicious and profitable investments in patents, embracing all departments in life, can here be found by parties of liberal as well as of limited means. Citizens and strangers, all, can find something to interest and profit them, and they are cordially invited to call at our depot, the latch string being out. Circulars descriptive of the objects of the agency can be had on application. [1] BUTLER, HOSFORD & CO.

SECOND-HAND SLIDE LATHES, UPRIGHT drills, iron planers, slotting machines, Dick's No. 1, power punching machine, suspension drills, scroll chucks, vices, &c.; also a Woodworth planer, Daniels' planers, power-mortising machine and tenoning machine. These tools are in good order, have been used in a large shop now giving up business, and will be sold at a bargain for cash or approved paper. For particulars, address CHAS. H. SMITH, No. 135 North Third-street, Philadelphia, Pa. 1 4*

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THE GRAEFENBERG THEORY AND PRACTICE OF MEDICINE.—On the 1st day of May, 1860, the Graefenberg Company's Sales-rooms, Consulting Offices and Medical Institute were removed from No. 34 Park-row to—

No. 2 Bond-street, New York,

(first door from Broadway,) in order to afford greater facilities and a more central location, demanded by the rapid increase of confidence in the Graefenberg Theory and Practice. The Graefenberg Theory and Practice, and the use of their medicines, together with complete symptoms of all diseases incident to this country and climate, the best method for their prevention and cure, will be found in the "Graefenberg Manual of Health."

This valuable family medical work, containing 300 pages, has been revised and improved, and elegantly illustrated with beautifully colored engravings of the human system. Sent by mail to any part of the country, on receipt of 25 cents. It is a complete guide to all diseases and their cure. Address

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Resident and Consulting Physician Graefenberg Co.,
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One of the leading journals says of the Graefenberg Manual of Health:—"This is the only medical book for family and general use ever published. It is written in plain language, free from scientific terms, and condenses more practical medical information than can be obtained anywhere else, unless a regular medical course of education is undergone. The popularity of this admirable and compendious work is well shown by this being the twenty-fourth edition. It contains a number of colored anatomical plates, and is a complete family physician. It is at once simple, popular, plain and explicit; and the mother, with such an adviser, is prepared at once to apply the proper remedies in case of sudden sickness in the family. In the country, a copy of the 'Manual of Health' is indispensable, and every family should possess one. It will save a hundred times its cost in doctors' bills, and, what is far better, will be the means of preserving many valuable lives to their families and relatives."
leowtf

PRACTICAL CHEMIST.—SITUATION WANTED as above. Address S. S., Box 2,916 New York Post-office. 1*

PROTECTION AGAINST FIRE.—MUELLER'S improved fire-extinguishing compound will suppress fire of every nature in dwellings, warerooms or vessels if applied at an early moment.

"I recommend it to the attention of all parties interested in the risk of destruction of goods by fire."—C. H. Haswell, Surveyor for Board of Underwriters.

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"A child can use it without fear. We hope every household may be plentifully supplied with this excellent compound."—New York Sunday Mercury.

Put up in boxes of 5, 10 and 20 pounds, to suit apartments of every size. Further information may be had of

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BURNELL'S PATENT ROTARY PUMP—adapted to all purposes of pumping, from the well and cistern to the steam fire-engine. The most simple, durable and efficient pump yet made. Principal sales depot at No. 23 Platt-street, New York. [1 1*] SAMUEL B. LEACH.

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CONSOLIDATION OF THE "AMERICAN" AND "NATIONAL" STEAM GAGE COMPANIES.—The "National Steam Gage Company" hereby give notice to their friends and the public that, having made a mutual ar an.ement with the "American Steam Gage Company" whereby the whole business of the two companies has been consolidated, all orders for gages heretofore made by the "National Steam Gage Company," under the patents of E. G. Allen, should be addressed hereafter to the "American Steam Gage Company," they having, by assignment, become the exclusive owners of said patents, and the rights to manufacture under them. Thanking our numerous friends for their generous patronage extended to us, we assure them that all orders addressed to the "American Steam Gage Company," for instruments heretofore manufactured by us, will be filled promptly, and with gages made in a style and finish equal to those heretofore made.

N. HUNT, President.
E. G. ALLEN, Superintendent.
A. N. CLARK, Treasurer.

The American Steam Gage Company will continue to manufacture the "Bourdon" Gage, and "T. W. Lane's improvement" on the same, as heretofore, and also all instruments heretofore made by the "National Steam Gage Company," under the various patents of E. G. Allen, and trust that their extended facilities for manufacturing will enable them to fill all orders in the best style of workmanship and finish. All orders for gages heretofore made and sold by the "National Steam Gage Company," under the patents of E. G. Allen, should hereafter be addressed to the "American Steam Gage Company," No. 4 Charlestown-street, Boston.

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THE DEFECATED OIL.—RAILROAD MANagers, engineers, machinists, &c., will find in this oil the long sought-for lubricator. It is manufactured from whale oil, and contains no mixture of any other oil, or any other substance. It neither blacks, gums nor corrodes the metal. It withstands more heat, endures more cold than any other oil, and is always uniform in quality. In a long report by Professor Silliman, of Yale College, he concludes thus—1st, That as a lubricator, the defecated oil stands unsurpassed; 2d, That, in its capacity to withstand changes of temperature and the causes which result in "gumming up," it is unrivaled. Manufactured by BILLINGS & MARSH, New London, Conn. 24 3*

$4.500 REWARD TO INVENTORS!—THE undersigned, on behalf of a committee appointed by the merchants and others of New Bedford, Mass., hereby offer the following premiums for the best stand and portable hand lamps, designed to be used for the burning of manufactured whale oil:—

For the best stand lamp $3,000
For the second-best stand lamp 300
For the best portable or hand lamp 1,000
For the second-best portable or hand lamp 200

All lamps offered for the premiums must be submitted to the committee at New Bedford, on or before the 30th day of August, 1860. The committee reserve the right to test all lamps submitted to them, and to reject all if, in their judgment, no one is deemed worthy of acceptance. They also will require the inventor to secure Letters Patent for the inventions which may be approved by them, if they deem it expedient, and to place the same, by proper assignment, under the control of the committee, upon such terms as may be agreed upon between them, JOSEPH GRINNELL, Chairman.
MATTHEW HOLLAND, Secretary. 24 4*

"Know, then, thyself; presume not God to scan—
The proper study of mankind is man."

NEW SELF-INSTRUCTOR IN PHYSIOLOGY—With more than a hundred Engraved Portraits of remarkable men and women. This excellent practical work embraces Signs of Character, Principles and Proofs of Phrenology, Analysis and Classification of the Faculties and a Chart for recording examinations. A handy 12mo. volume, revised and enlarged; 175 pages, bound with gilt back and sides. Prepaid, by mail, only 50 cents. Address
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FOR SALE OR TO LET—THE ESTATE, IN Lynn, Mass., lately leased by J. B. Bigelow & Co., of Boston, consisting of 8 acres of land, two 3½ story buildings—one 35 by 100 feet and one 40 by 85 feet; two storehouses, one 30 by 50 and one 20 by 100 feet, and other outbuildings; 7 tenement houses; 8-horse water-power (unfailing); 20-horse steam engine—all in good repair. Buildings heated by steam. A constant supply of THE BEST WATER IN THE STATE for chemical or mechanical purposes. Ten miles, by railroad, from Boston; labor plenty. Offers rare facilities for paper, morocco, paper-hangings or dye-house business. Possession given August 1, 1860. Apply to JOHN P. WOODBURY, Lynn, or T. RADDIN, No. 30 Pearl-street, Boston, Mass. 25 3*

HOPKINS & ANDERSON'S CELEBRATED "Self-generating Gas Lamps"—the "Family Air-pressure" and the "Lilliputian."—The best and most economical Lamps ever offered to the public. The burners are splendidly adapted to all descriptions of lamps, from the smallest to the largest. Patented April 3, 1860. State, district and county rights for sale. Send for circulars and particulars to the proprietors, HOPKINS & ANDERSON, Easton, Talbot county, Md.

From Gen. Tench Tilghman, late President of the United States Agricultural Society:—

OXFORD, Md., June 1, 1860.

Messrs. HOPKINS & ANDERSON—Gentlemen: I have been using, for several weeks, one of your Parlor Lamps, known as "Anderson's Air-pressure Gas Generator," and also one of your "Lilliputian Gas-burners," or Chamber Lamps. The light resembles the gas light more than that of any light I have ever used; while the consumption of oil is less than that of other lamps, and the security from accidents is greater than in other lamps in which the etherial oil is used. Your obedient servant, TENCH TILGHMAN.
25 2*

READY THIS DAY.—NEW EDITION, REvised and Enlarged.—"Wells' Every Man his Own Lawyer and United States Form Book." A complete and reliable guide to all matters of business negotiations for every State in the Union, containing simple instructions to enable all classes to transact their business in a legal way without legal assistance. Also, containing the laws of the various States and Territories concerning the Collection of Debts, Property Exempt from Execution, Lien Laws, Laws of Limitation, Laws of Contract, Legal Rates of Interest, License to Sell Goods, Qualifications of Voters, &c., &c. ☞ No man or business woman should be without this work; it will save many times its cost, much perplexity and loss of time. 12mo., 408 pages, law binding; price $1. Sent postpaid. Agents wanted for this and other popular publications. Address JOHN G. WELLS, Publisher, corner of Park-row and Beekman-streets, New York. 25 tf

MACHINISTS, &C.—INVENTORS' MODELS made by STOCKMAR & BAADE, No. 39 Greene-street, near Grand, New York City. 25 13*

NEW YORK MACHINERY DEPOT, NO. 222 Pearl-street (fronting Platt-street), STEVENS, BROTHER & CO.—Every kind and description of Machinery can be obtained at this establishment, and at the lowest manufacturers' prices. All kinds of Steam Engines (stationary and portable), Steam Boilers, Lathes, Drills, Planers, Gear-cutters, Mortising Machines, Tenoning Machines, &c., &c.; Leather Belting, very superior; Babbit Metals, &c., &c. 25 1*

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PORTER'S CENTRIFUGAL GOVERNOR.—THE attention of parties troubled with irregular or unsteady power is respectfully called to this Governor, now coming into general use. It may be used in connection with any valve or cut-off, and will regulate the motion of the engine so perfectly that its entire load may be thrown on or off at once, without sensibly affecting its speed. I will send a Governor to any responsible person for trial; and if its action is not perfect under the above test, it may be returned. Prices exceedingly moderate. All orders and communications will receive prompt attention. Send for a circular.

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N. B.—Manganese, Vienna Lime, Asbestos, Fly-paper, true Insect Powder, Fluoric Acid, Aluminum, Plumbago, Pyrotechnic and Glassmakers' materials. 23 4*

KNITTING MACHINES.—J. B. AIKEN'S power, ribbed and plain knitting machines for factory use; winders, bobbins, &c., furnished at short notice. For pamphlet descriptive of machines, address Aiken Knitting Machine Co., No. 429 Broadway, New York. 22 13

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PORTABLE STEAM ENGINES, COMBINING the maximum of efficiency, durability and economy with the minimum of weight and price. They received the large gold medal of the American Institute, at their late fair, as "the best Portable Steam Engine." Descriptive circulars sent on application. Address J. C. HOADLEY, Lawrence, Mass. 22 26*

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AIKEN KNITTING MACHINE COMPANY, NO. 429 Broadway, New York, sole proprietors of J. B. Aiken's family and plantation knitting machines. Extremely simple, profitable and durable. Satisfaction guaranteed to all. Send in your address, every one, and full particulars will be sent to you, with illustration of machine, gratis. 22 13

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A MESSIEURS LES INVENTEURS—AVIS IMportant.—Les inventeurs non familiers avec la langue Anglaise, et qui prefereraient nous communiquer leurs inventions en Francais, peuvent nous addresser dans leur langue natale. Envoyez nous un dessin et une description concise pour notre examen. Toutes communications seront reçues en confidence.
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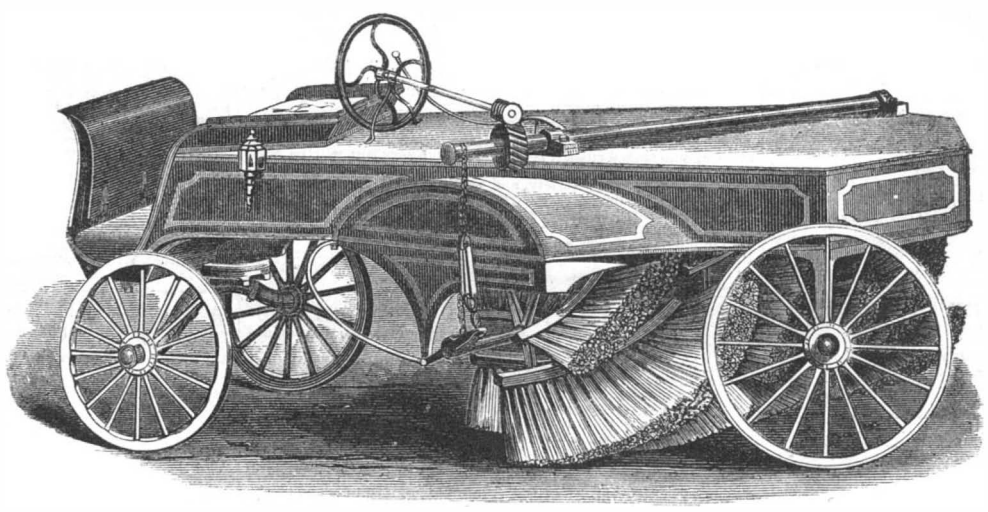
SELF-ADJUSTING STREET-SWEEPING MACHINE.

More than one thousand dollars per day are expended in cleaning the streets of New York, and yet the work is so imperfectly done that both citizens and sojourners unite in one constant series of complaints at the filthiness of this city. Broadway, and other streets paved with smooth blocks of granite, are kept clean by means of street-sweeping machines; but these have not been found to work well hitherto on cobble-stone pavements.

The machine represented in the annexed engravings is intended for all kinds of pavement, and is claimed to have been thoroughly tested and to have proved perfectly successful. It sweeps the dirt to the side of the wagon; the design being to deposit it in long windrows, in the gutter, ready to be shoveled into carts. The brush, which is suspended diagonally below the wagon, is constructed in fine threads wound spirally around the axle, each thread being made in sections, and each section being connected with the axle by means of springs. The mode of attaching the several sections of the brush to the axle is shown in Fig. 2. From the axle, A, five spokes, B B B B, radiate, and to the end of each of these spokes is attached by a working joint an elbow, C, to the end of which one end of a section of the brush is secured. A spiral spring, D, presses the brush outward from the center, but allows it to be forced inward whenever it encounters any rigid obstacle. The opposite end of the section is secured in like manner to the succeeding spoke.



EDSON'S SELF-ADJUSTING STREET-SWEEPING MACHINE.

It will be seen that, by this arrrangement, very great elasticity of every portion of the brush is obtained, enabling it to adapt itself to all the inequalities of surface of the streets, however uneven may be the pavement.

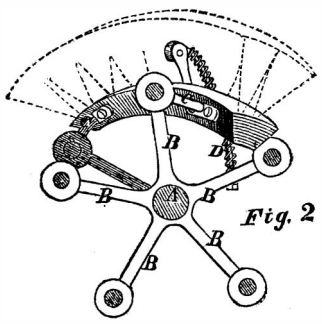


Fig. 2

By means of bands from the ends of the brush, which are wrapped around the ends of a shaft extending across the carriage (which shaft is connected by a gear and rod with a hand wheel), the hight of the brush in relation to that of the wheels is readily adjusted.

The patent for this invention was obtained April 5, 1859; and persons desiring further information in relation to it may address H. F. Gardner, M.D., No. 46 Essex-street, Boston, Mass.

BRITISH GUN-BOATS—PRIVATE BUILDERS—AMERICAN OAK.

We have sometimes indulged in a healthy rebuke of the reprehensible manner in which affairs are occasionally conducted in our navy-yards; and we have felt no small amount of mortification in the revelation of many discreditable facts of inferior timber being employed in such government vessels as the *Saginaw* and others. Our complaints afforded our respected uncle, John Bull, a very good feast for his usual self-importance; so he gave his portentous Yorkshire head an unusual wag, and down went his heavy foot on the ground, with the chuckle in his ruddy cheeks:—"We knows how to do better than that in England." A black mark has long existed at Lloyd's against American-built oak ships, but the revelations which have recently been made of the rotten condition of the new gun-boats, built of British oak, have startled the whole English community.

Uncle Sam is a clever, good-natured sort of a being, very free with his purse, but he is altogether too smart to be "taken in" as Uncle John was with the gun-boats that were built for him during the Crimean war, a very few years ago. No less than 45 of these were recently taken into the docks of Haslar for repairing, when they were found to be in a rotten condition, and the bolting so defective as to call forth public execration. These boats were built by *private* contractors, and these have been denounced with just severity. It is not a little remarkable that the worst war vessels built in England and America have been furnished by private builders. We have, perhaps, been too ready to blame government officials for unfaithfulness in their duties. The *Niagara*—which is our largest frigate, and was built by the late George Steers—is said to be the most defective war vessel in our navy. This may not be true, but such an opinion has been pretty widely circulated.

The condition of the rotten gun-boats in England was brought to light by the *press*—that indefatigable servant of the public; and now is the time when we, with a sense of justice, call upon our English brethren to throw away their prejudices against American oak, and give our vessels that rank at Lloyd's, for goodness and durability, which has heretofore been denied to them. On this subject, Donald McKay (who is now in Europe) says:—"The only apology the English ship-builders make for the rotten state of the gun-boats, is that they used unseasoned oak in their construction. Four years have been sufficient to reduce these boats to a frightful state of rottenness. If we compare with that, the state in which our American steam vessels are after double the length of time (though they are not only built of unseasoned, but of entirely green material—white oak), any unprejudiced person must come to the conclusion that the American white oak is a very superior material for ship-building, notwithstanding the contrary opinion of Lloyd's committee. I cannot help pronouncing my opinion on this occasion, that the American white oak growing along the coast from New Hampshire southward to Virginia and Maryland, is the best material for ship-building in the world; and I say this after having had an opportunity to examine the best stocks of timber in the navy-yards of England and France, cut in all parts of the globe. I confidently express my opinion that ships built with the best seasoned American white oak will, on an average, attain an age of over 30 years, as it has also been proved by experience."

FORM AND POWER OF CHAIN CABLES.—When Thos. Talfourd, the great engineer, proposed the erection of the Menai Suspension Bridge, he performed numerous experiments on the tensile strength of malleable iron, by which he ascertained that the mean force required to produce rupture in a bar of one square inch sectional area was equivalent to a dead weight of 29½ tuns, or 66,080 lbs. ayoirdupois, executed in the direction of the fibers; and this has been adopted, conventionally, by the most eminent engineers as a standard for tensile strain ever since, assuming one-half of it (or 14¾ tuns) as a measure of the force to which a bar of iron may be constantly subjected if drawn in the direction of its length. Now, in the case of a cable link with straight sides, the direction of the strain may, for all practical purposes, be considered as nearly coincident with the fibers of the metal; and, admitting this, the strain, or rather the force of resistance, will be directly proportional to the number of fibers in the transverse section. Thus: if the sectional area be equal to two square inches, the constant straining force to which the metal may be exposed is 29½ tuns, or 59 tuns to produce fracture; the half of this being what was found to rupture a bar of one square inch of section. Therefore, admitting the strain on the link of a cable to be similar to that on a straight bar, where every fiber is equally strained, a link of seven-eighths of an inch in diameter will show a practical resistance of $\frac{7}{8} \times \frac{7}{8} \times 59.4 \times 0.7854 =$ 8.87 tuns, the weight which a bar of one inch area of section will bear with safety, the metal being of a medium quality. This, in round numbers, may be taken at 9 tuns. With regard to the link of an oval form with a stud in the middle, it cannot be so strong as the one without it, for it is manifest that the stud, besides increasing the weight of the chain very considerably, acts as a transverse lever on the fibers of the metal, which, being compounded with the tensile strain, must, in some measure, operate to increase the effect; for a strain that is partly tensile and partly transverse must be more efficacious in producing rupture than one that is purely tensile.—*Mitchell's Steam-shipping Journal, London.*

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